

POPULAR MECHANICS

MAGAZINE

REG'D. TRADE MARK, GREAT BRITAIN, No. 410628



Twin Outboards
page 160

They Outsmart Death in the Air
What Owners Say About
the **FORD SIX**

For the Craftsman
GUARD YOUR CAR FROM THIEVES

Only the Incredible **MONTA MOWER**

TRIMS AS IT MOWS - IN ONE EASY OPERATION

1. The MontaMower smoothly cuts standard 16" swath through grass, dandelions, and tall lawn weeds (including those that pop up with a conventional mower to cause you extra work). Operates easily and efficiently . . . even on steep terraces!
2. It is actually "Two-Tools-In-One" . . . an efficient lawn mower and a very fast lawn trimmer. It cuts and trims right up close to trees, etc.
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Greatest
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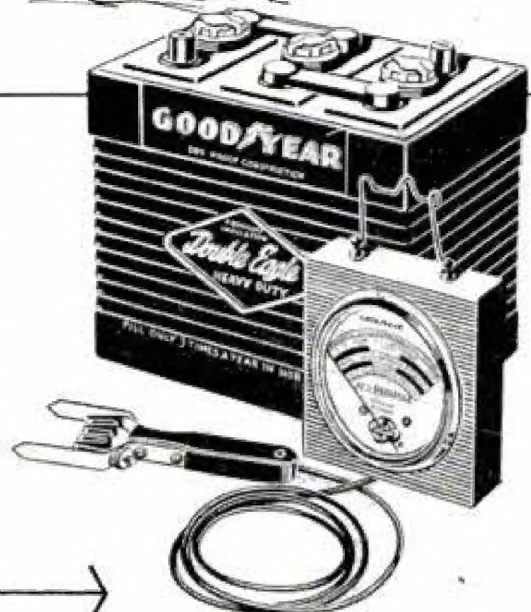
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Goodyear, Battery Dept., Akron 16, Ohio



Double Eagle—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

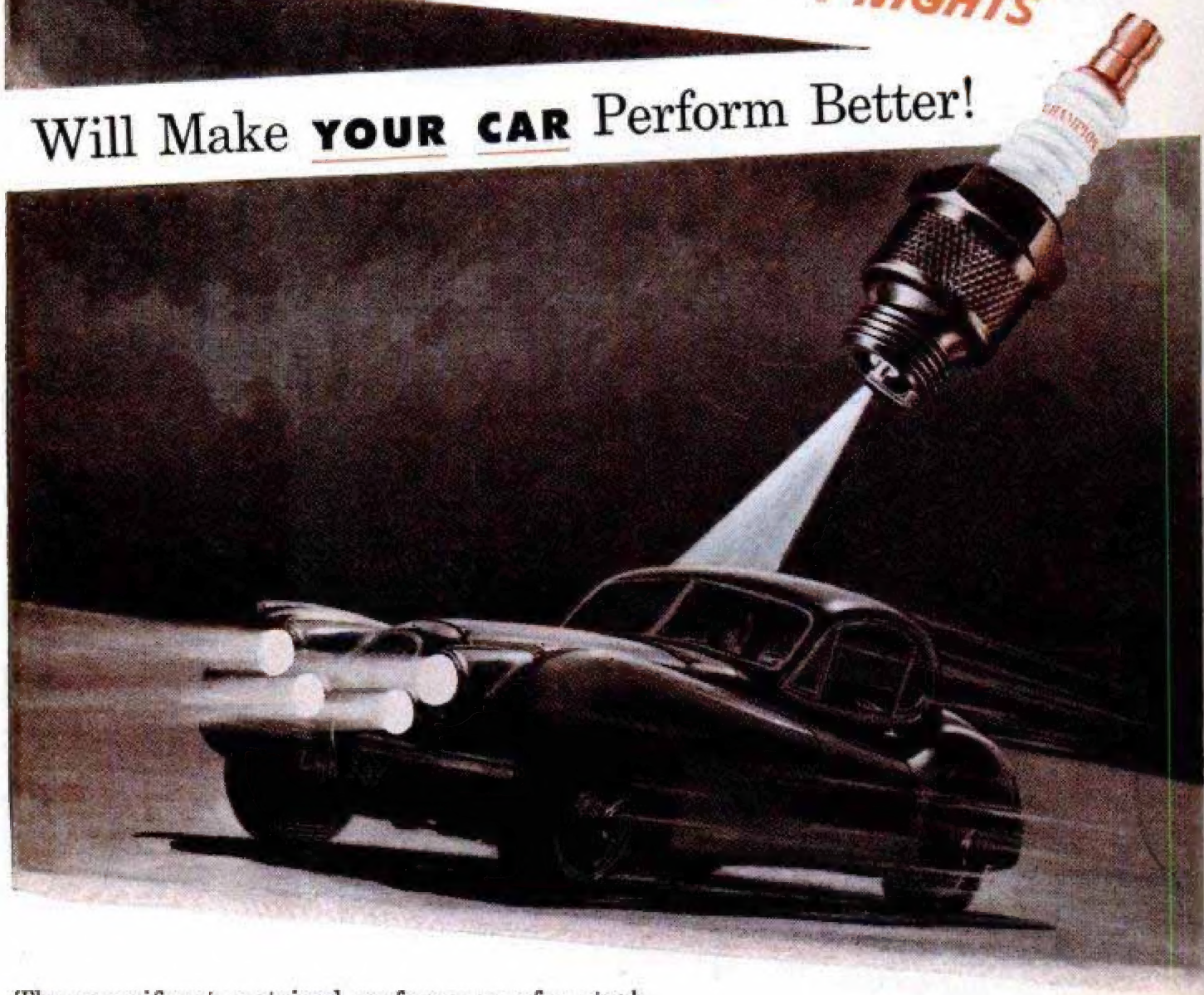
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Popular Mechanics Magazine

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H. H. WINDSOR, Founder

H. H. WINDSOR, JR., Editor and Publisher



this month's cover

HANG ON to your line—there goes Harris Ewald in his cabin cruiser! Fifty horses churn the craft through the water, for Ewald has come up with the novel idea of mounting two 25-horsepower outboard motors behind the 18-foot boat. Now he skims along Lake Michigan at 30 miles per hour to the throb of the twin putt-putts. It's all a part of a bigger story—the fact that cabin cruisers no longer are a novelty. Once too high-priced for the average man, cruisers now cost less than the family car and are owned by a lot of average men. The yacht-club set has changed in the past few years—it's been invaded by these everyday sailors with their outboard motors. The broad-beamed outboard cruiser now reigns on rivers, lakes and oceans. It's not unusual for a family to take a 1500-mile voyage in a high-riding little craft. You'll find details of Ewald's cruiser on page 160, followed by a preview of some spanking new boats you'll be seeing in near-by waters soon

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For the Craftsman

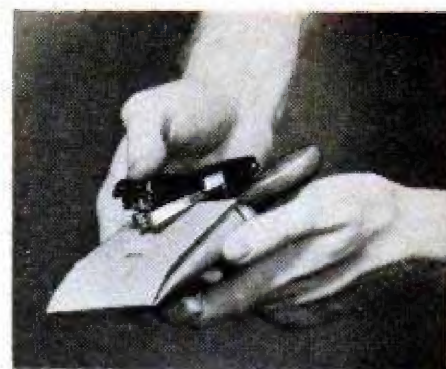
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Other items, and manufacturers of available products described, are listed on pages 12, 14 and 16

FASTEN IT FASTER



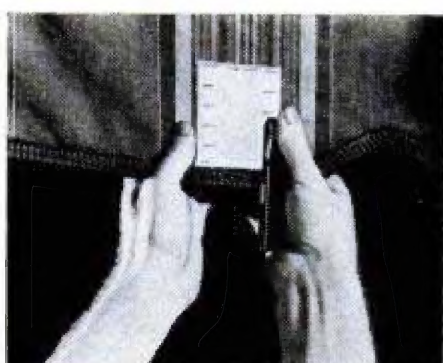
PLASTIC SCREENING can be tacked to frames quickly and easily with *Bostitch B-8* used as tacker.



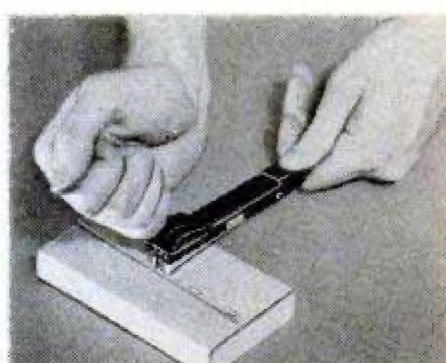
PUT WRAPS on your paint brushes between jobs. *Bostitch B-8* has removable base for getting into tight places.



STOP HEAT LOSS by covering warm air ducts with asbestos paper. *Bostitch B-8* makes it an easy, one-night project.



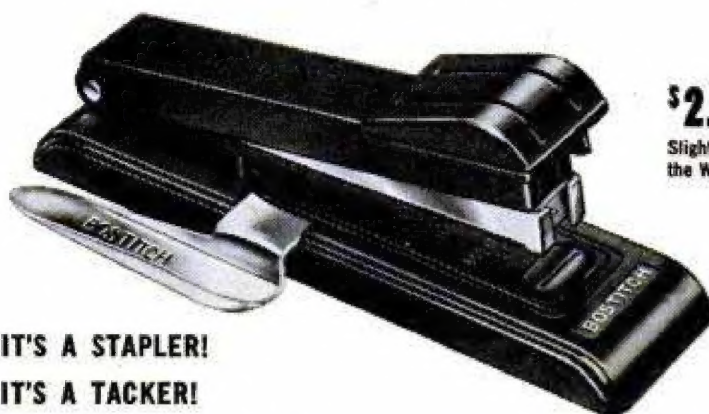
TORN CANVAS on awnings or furniture can be mended by stapling parts with *Bostitch B-8*.



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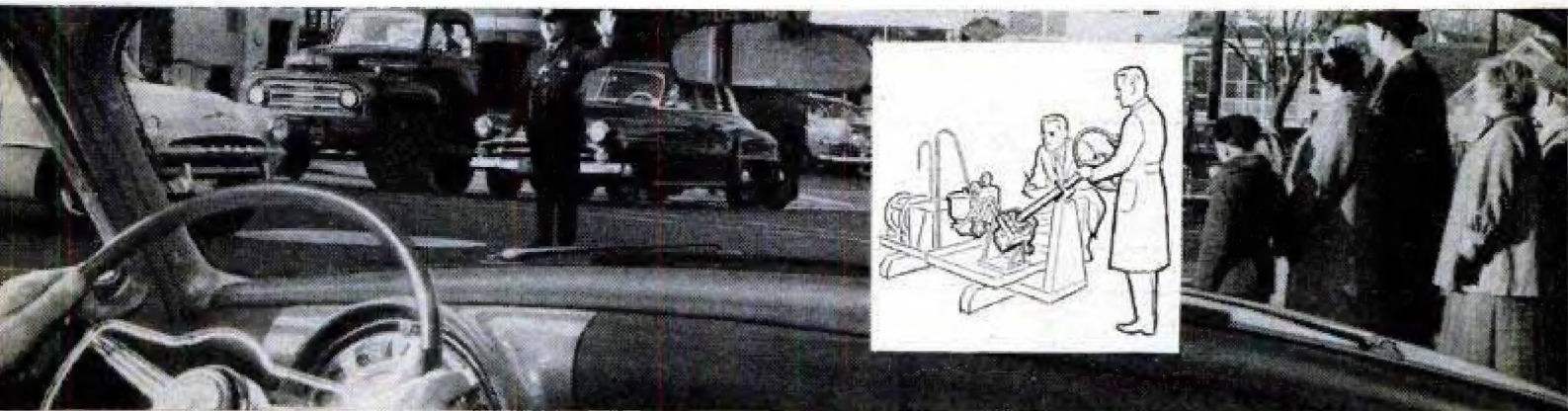
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THE EDITORS



To the Editor:

At the last executive-committee meeting of the U. S. Junior Chamber of Commerce, a plan for building motor units to mechanize wheel chairs—described in your March issue—was presented for our consideration as a national project.

I am pleased to inform you that it was unanimously adopted as part of our public-health program for 1953, and all our chapters throughout the United States will be encouraged to participate in the building of these units.

We are deeply indebted to your publication for making possible the "wooden lung" project which proved so successful last year. More than 700 of our chapters requested plans for building the lung and I'm confident the mechanized-wheel-chair project will be received even more enthusiastically by our members and the public at large.

Horace E. Henderson, Pres.,
U. S. Junior Chamber of Commerce.

To the Editor:

In reading your article in the February issue titled, "Titanium—Tough Guy of the Lightweights," by Ewart Thomas, the statement is made, "It can be spot-welded but not fusion welded." The writer would like to draw your attention to the last half of the statement which is incorrect. If Mr. Thomas will read the writer's article entitled "Forming and Welding Titanium" appearing in the November issue of "The Welding Journal," he will have a good idea of how titanium can be welded.

Titanium at the present time is available in several different alloys and some of these alloys are very difficult to fusion weld. The statement might be made that only commercially pure titanium can be welded in production at the present time.

The writer enjoys reading your magazine and hopes to read many more.

Francis H. Stevenson,
Chair Aircraft and Rocketry,
Welding Panel,
Los Angeles Section,
American Welding Society.

To the Editor:

The wooden lung constructed by the East St. Louis Junior Chamber of Commerce

(Continued to page 8)

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Assignment 1

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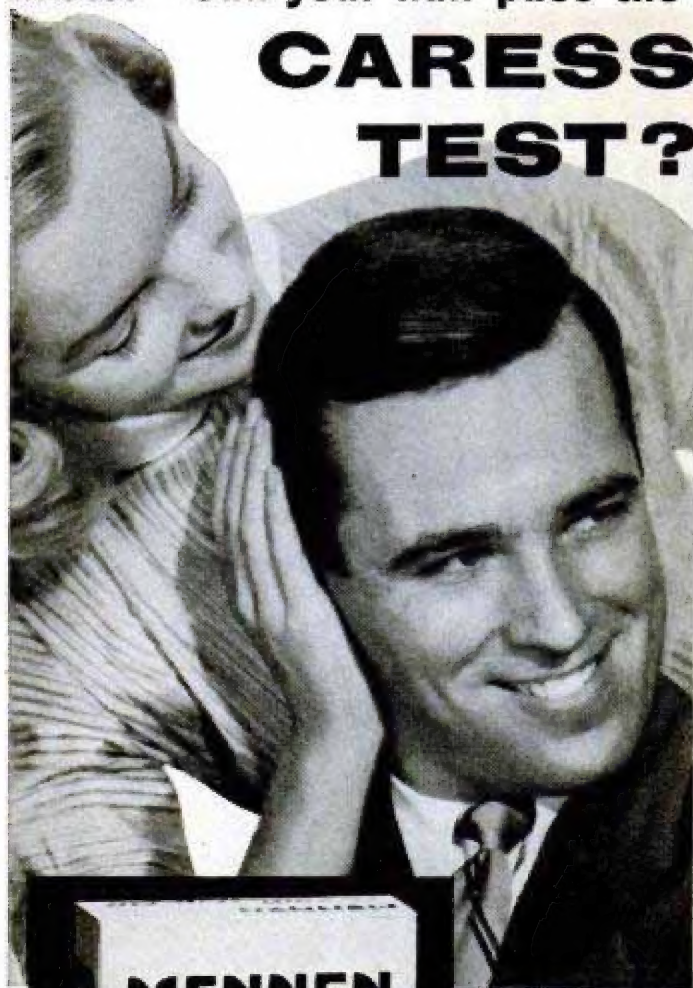
Present Position.....

This One



8UDL-BJ2-H5S1

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MENNEN
Cream Hair Oil **FOR MEN**

(Continued from page 6)

and presented to St. Mary's Hospital of East St. Louis . . . received its first test on Dec. 14 when a young mother suffering



from a respiratory failure was placed in it for 1½ hours. It is credited with keeping her alive.

The patient seen in the lung [above] is a polio patient and has been in an iron lung for four years. She consented to try out our lung for the picture.

Thomas E. Prosser III, D.D.S.,
Chairman, Public Health Committee,
Illinois Junior Chamber of Commerce.

Editor's Note:

Plans for the wooden lung, described in PM (Jan. 1952) were furnished by Popular Mechanics Magazine to the U. S. Junior Chamber of Commerce for its national project of 1952.

To the Editor:

Just finished reading "Pop Mech's" February issue with its "Special! Giant Auto Supplement." It's one of the best jobs I've ever seen.

Gene M. Brown,
Herald Tribune,
New York, N. Y.

To the Editor:

In the very interesting February issue of *Popular Mechanics* is an article "Antiques on Parade," a fascinating story of some of the old-timers.

On page 132 is a photo under a heading of a 1911 Cadillac which I identify as a Mercer.

I am somewhat of an old-timer myself, starting driving in 1908 and having escaped the hazards of the highways over a distance

(Continued to page 10)

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<input type="checkbox"/> Steam Fitting
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<input type="checkbox"/> Sheet Metal Drafting
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<input type="checkbox"/> Electrician
<input type="checkbox"/> Electrical Maintenance
<input type="checkbox"/> Electrical Drafting
<input type="checkbox"/> Electric Power and Light
<input type="checkbox"/> Lineman
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<input type="checkbox"/> Mathematics
<input type="checkbox"/> Commercial
<input type="checkbox"/> Good English
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<input type="checkbox"/> Mechanical Engineering
<input type="checkbox"/> Industrial Engineering
<input type="checkbox"/> Industrial Supervision
<input type="checkbox"/> Foremanship
<input type="checkbox"/> Mechanical Drafting
<input type="checkbox"/> Machine Design-Drafting
<input type="checkbox"/> Machine Shop Practice
<input type="checkbox"/> Tool Design
<input type="checkbox"/> Industrial Instrumentation
<input type="checkbox"/> Machine Shop Inspection
<input type="checkbox"/> Reading Blueprints
<input type="checkbox"/> Toolmaking
<input type="checkbox"/> Gas—Electric Welding
<input type="checkbox"/> Heat Treatment—Metallurgy
<input type="checkbox"/> Sheet Metal Work
<input type="checkbox"/> Sheet Metal Pattern Drafting
<input type="checkbox"/> Refrigeration
POWER
<input type="checkbox"/> Combustion Engineering
<input type="checkbox"/> Diesel—Electric
<input type="checkbox"/> Electric Light and Power | <input type="checkbox"/> Stationary Steam Engineering
<input type="checkbox"/> Stationary Fireman
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<input type="checkbox"/> Radio Operation
<input type="checkbox"/> Radio Servicing—FM
<input type="checkbox"/> Television
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<input type="checkbox"/> Diesel Locomotive
<input type="checkbox"/> Air Brakes
<input type="checkbox"/> Car Inspector
<input type="checkbox"/> Railroad Administration
TEXTILE
<input type="checkbox"/> Textile Engineering
<input type="checkbox"/> Cotton Manufacture
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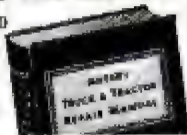
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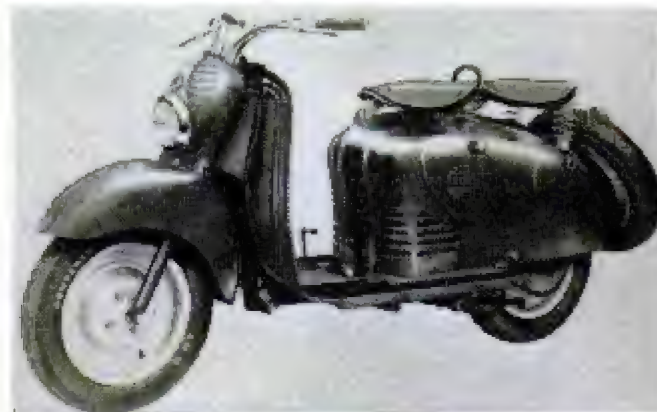
of 1,500,000 miles. I have owned since 1918 a Knox Model R raceabout which (far as I have been able to determine) is the only one left if not the sole one built.

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as I am an owner of a Puch 125-cubic-centimeter motorcycle . . . [Herewith is] a photo of the new Puch RL 125 Motor which may be of interest. To my knowledge, this scooter is not available in this country as yet.

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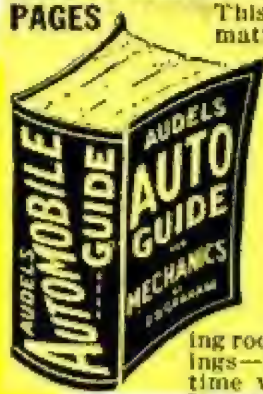
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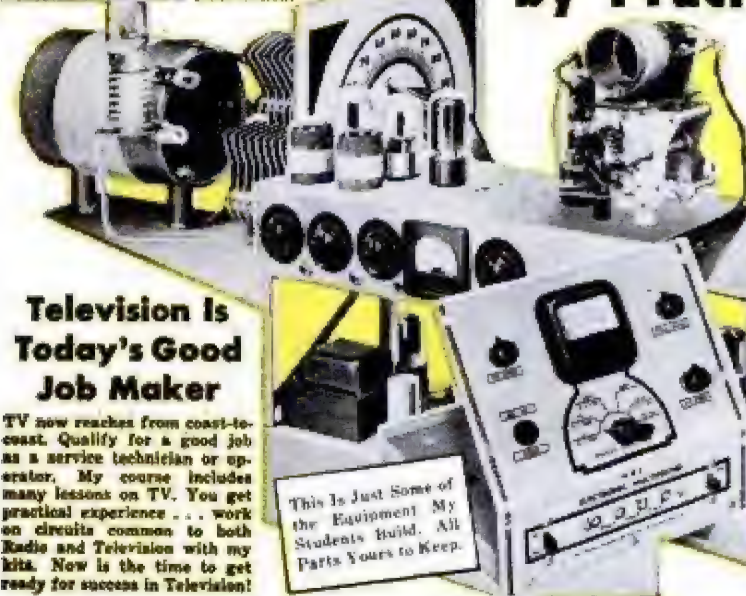
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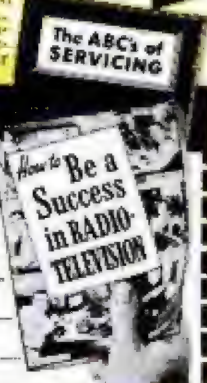
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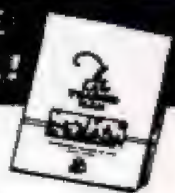
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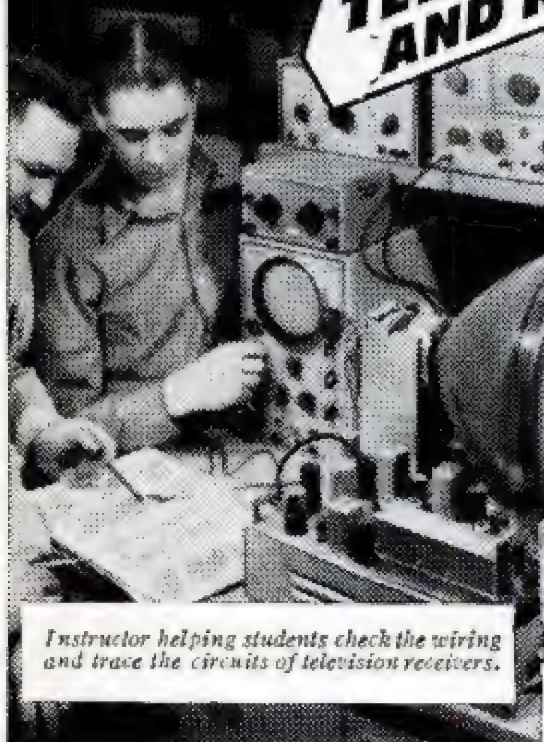
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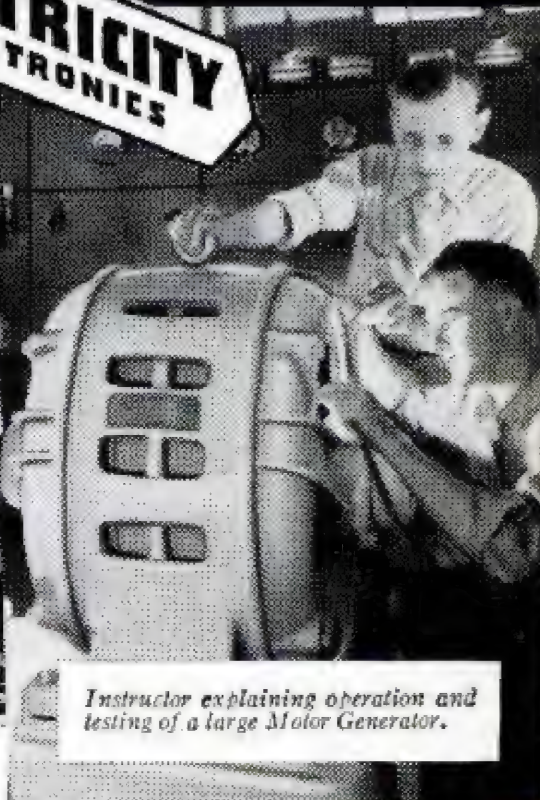
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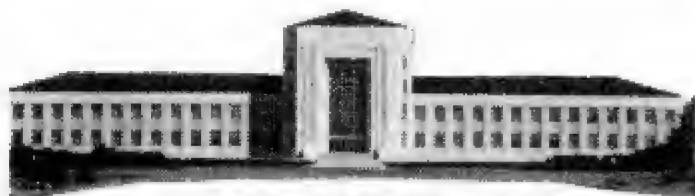
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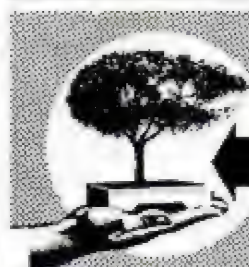
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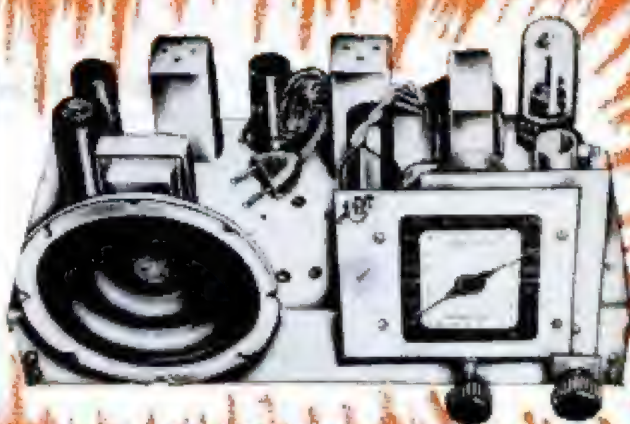
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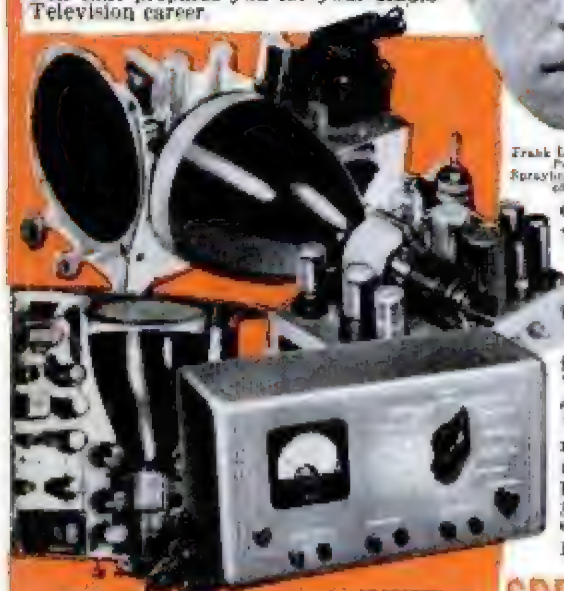
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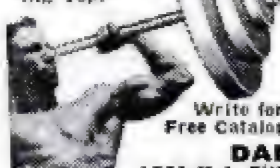
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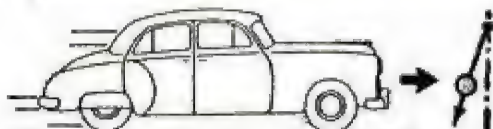
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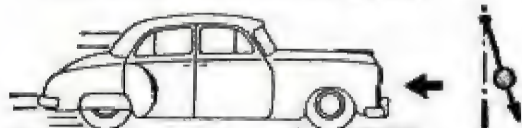
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Step on the gas, the pendulum swings backward. The amount it moves indicates car performance and power.



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700x16	6.42	760x15	5.82	750x15	10.52	1000x20	18.32
750x16	6.92	800x15	6.72	825x15	11.52	1100x20	18.32
825x16	4.82	820x15	6.62	800x20	8.62	1100x20	18.32
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Have you ever wondered why your TV set can't be fixed—why your TV picture still gets aggravating wavy lines, streaks, distortions and zags—why high powered aerials, expensive new sets, even top flight servicemen often fail to stop this TV interference?

THE TRUTH ABOUT YOUR TV SET

It is a known fact that your TV antenna not only picks up the picture waves you see on your screen, but also picks up electric static waves that can ruin your picture.

THE REAL CAUSES OF TV INTERFERENCE

And the reason you or your repairman have never been able to block out this interference is because it does not come from within your TV set but from sources outside your TV set! These sources are the real cause of TV interference. These are what may cause your TV screen to flicker, flutter, streak or get hazy.

For instance, you yourself, realize that a doctor's diathermy machine up to 2½ miles from your home can ruin your TV viewing pleasure for hours on end.

But do you know that a car or truck passing your home can streak, distort your TV picture?

Do you know that nearby telephone lines or neon advertising signs, can make your screen flicker and flutter?

And do you know that any electrical appliance in your home—or your neighbor's home—can streak, distort and haze your TV picture for an entire evening?

ANY ONE OF THESE CAN CAUSE YOUR TV INTERFERENCE

Inside Your Home

Electric toasters	Phonographs
Vacuum cleaners	Electric razors
Sewing machines	Refrigerators
Electric broilers	Oil burners
Ringing telephone	Door bells
	Radios

Outside Your Home

Cars	Streetcars
Busses	Trucks
Trains	Doctor's diathermy machine
Hospital machines	Subways
Electric cash register	FM Radio interference

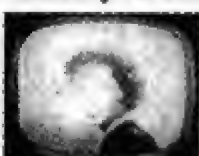
WHICH OF THESE TV HEAD-ACHES DO YOU WANT TO STOP—IN JUST 45 SECONDS!



STREAKS caused by cars, trains, subways, cash registers, electrical appliances

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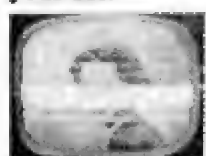
WEAK PICTURE—TELEVISION CLARIFIES weak signal. Helps to hold picture bright and steady.



WAVY LINES caused by "Hams," FM broadcast stations, other TV sets, antennas,

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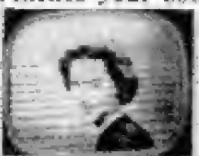
F A D E D PICTURE due to weak, static ridden signals can be **CLARIFIED** by TELERON before it reaches your set.



B O R E R E F F E C T caused by doctor's diathermy machines, hospital machines,

can be **BLOCKED OUT** by TELERON before it reaches your set.

TV STATIC caused by telephone lines, neon signs, atmospheric conditions, can be **BLOCKED OUT** by TELERON, before it reaches your set.



HOW TO STOP TV INTERFERENCE IN JUST 45 SECONDS!

The only way to eliminate TV interference is to **BLOCK IT OUT**, before it reaches your set

—in exactly the same way sunlight glare is blocked out by sunglasses before it reaches your eyes.

1. You can install an antenna-filter to help reduce interference seeping through your antenna, **BUT IT CANNOT STOP** streaks, wavy lines or TV static due to interference pouring in through your wall socket.

2. Or you can fix your set yourself in just 45 seconds simply by clipping onto your set a new double protection filter circuit and power line plug that not only blocks out interference coming in through your antenna, but also blocks out interference coming through your wall socket. The name of this amazing invention is the **TELERON INTERFERENCE TRAP** which actually blocks out these interference waves before they reach your set.

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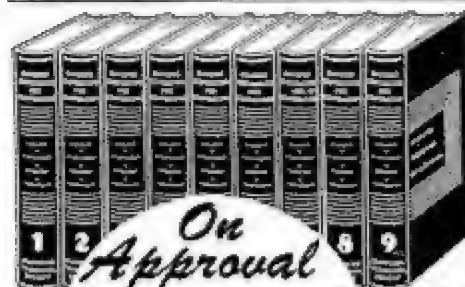
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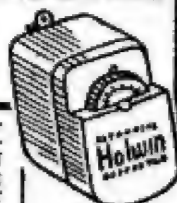
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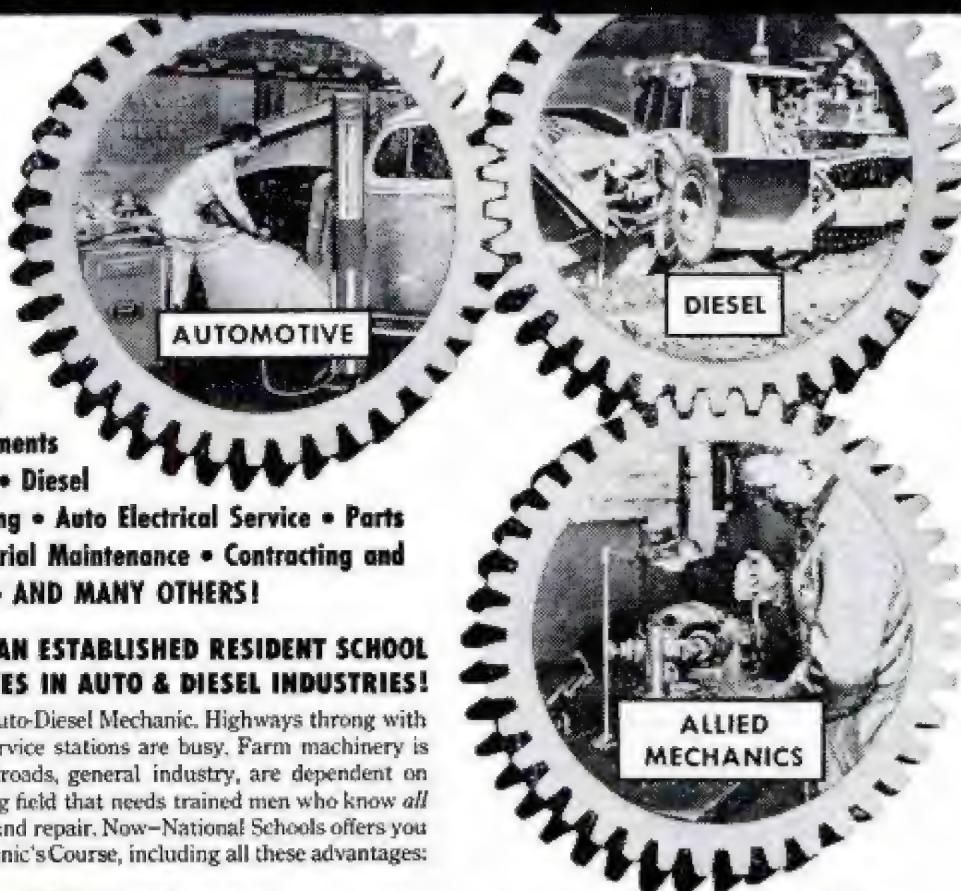
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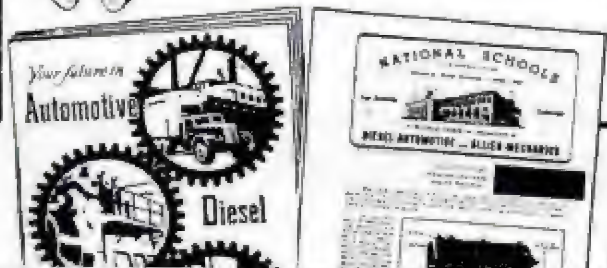
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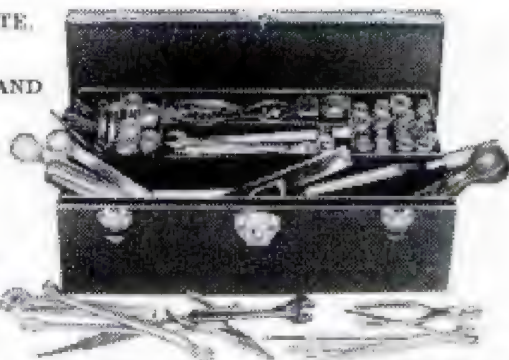
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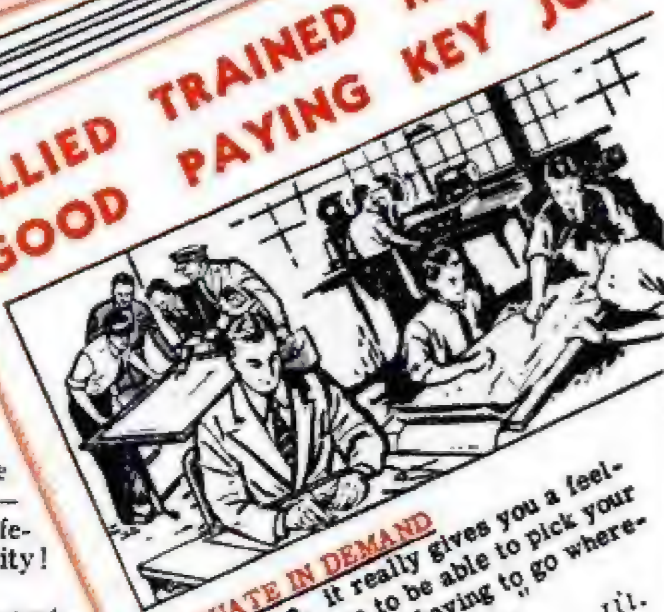
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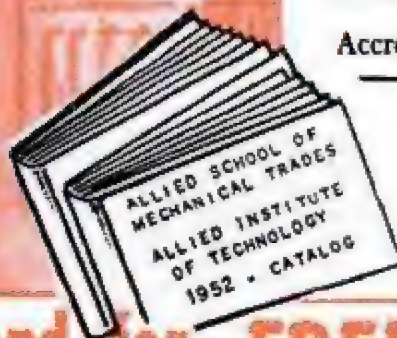
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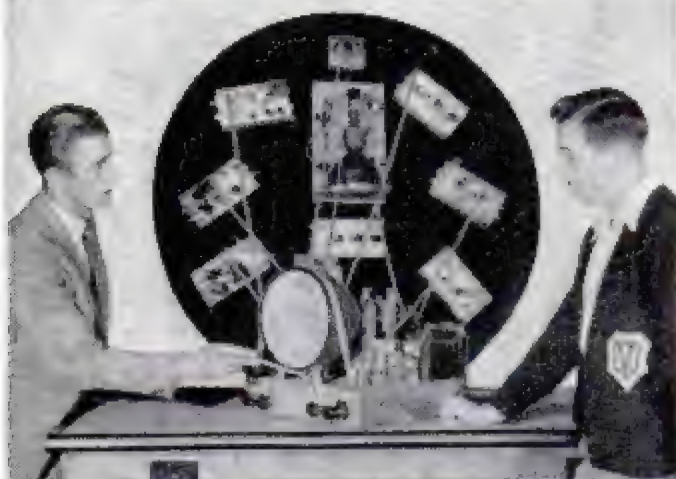
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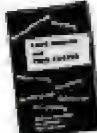
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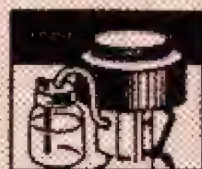
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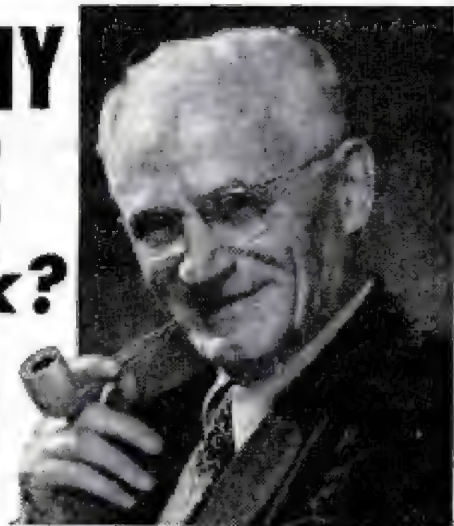
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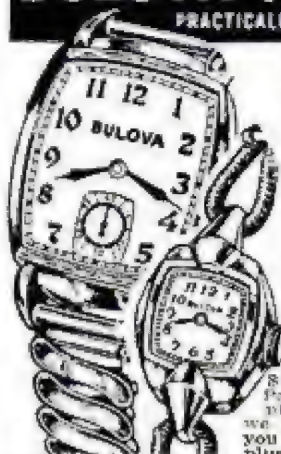
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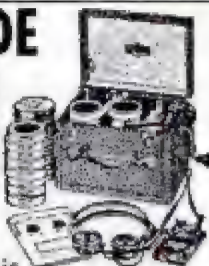
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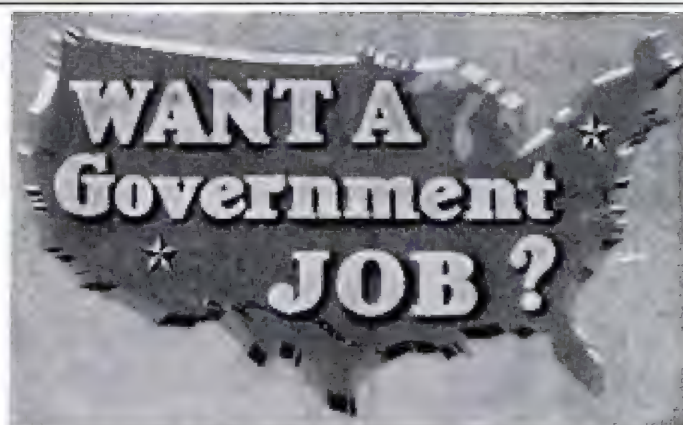
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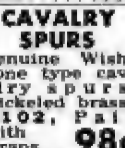
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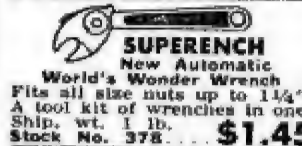
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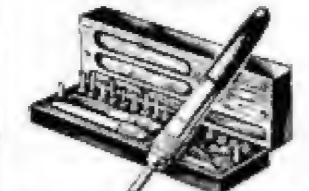


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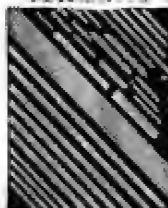
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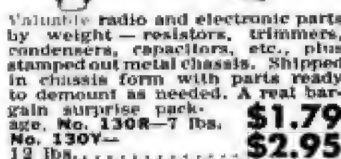
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UNUSED Matchbook covers—100 different \$1.00 38-page catalog 25c. Charles Edelman, 1311C East 84, Cleveland 3, Ohio.

INVENTING Can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 40-E 831-E St. N.W., Washington 4, D. C.

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BASS Says: Trading since 1910. Used but good as new buys; 8mm. B.&H. Sportster \$52.50; 16mm. Keystone A-7, F:2.8 lens \$37.50; Voigt 35mm. Vito II, flash shutter, Skopar F:3.5, like new \$38.50; Kodak Reflex F:3.5 lens, like new \$38.50; Contax I, F:2.8 Sonnar \$87.50; 3 1/4 x 4 1/4 Speed Graphic, Skopar F:4.5, Ibsor shutter, \$52.50. Satisfaction guaranteed. Bass Camera Co., Dept. AG, 179 W. Madison St., Chicago 2.

FREE Photographic bargain book packed with hundreds of sensational values in still and movie cameras, lenses and latest accessories. Super savings for you in new and used equipment. No money down. Up to 15 months to pay. Liberal trade-in allowances, too, on your own equipment. Write now for your free copy to Central Camera Co., Dept. 9A, 230 S. Wabash Ave., Chicago 4, Ill. (Photographic headquarters since 1890.)

SAVE Money on guaranteed nationally advertised camera film. Write for price list. Ideal Service Supply, 2101-B, Barclay Road, Oklahoma City 14, Okla.

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NEW Cameras \$2.00 postpaid. Wallace Jewelry, 3783-G South Wabash, Chicago.

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CLOSING Out cameras, projectors. Free list. Bob's, 1210X 6th Ave., New York City.

BUY Wholesale nationally advertised cameras, photo supplies, thousands other products at big discount. Free "wholesale plan." American Buyers, 629-RR Linden, Buffalo 16, N. Y.

DIRECT From manufacturer. 2x2 slide projector, 100w \$12.95, guaranteed. Vusaid, Box 74, Ann Arbor, Mich.

PHOTOMURALS. Your negative or ours, Catalogue 25c. Photomammoth Murals, Dept. M, 12048 Vanowen Street, North Hollywood, California.

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BEAUTIFUL Sepia toned, silk finish enlargements, made from your negative. Four 5x7s or three 8x10s \$1.00. Harvey Photo, 137 Spring Garden, Easton, Penna.

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JUMBO Prints (deckle edge)—8 to 12 exposure film 39c per roll, developed and printed. Same-day service. Dean Studios, Dept. 6, Des Moines 2, Iowa.

BEAUTIFUL Enlargement from each picture on 8 exposure roll 35c. Cut Rate Photos, Dept. B-4, Janesville, Wis.

TWO Prints each good negative, 3 exp. 35c; 12 exp. 50c; 16 exp. 65c. Reprints 5c. Mayfair Photo Service, Box 617-K, Toledo, Ohio.

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5000 NEW-Used 8-16mm. silent-sound films. International-B, 2120 Strauss, Brooklyn 12.

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EARN Money with typewriter—Sewing machine! Details free. Edwards, 3915-PM, 12th, Des Moines 13, Iowa.

MADE \$24,500 Using money making plans from Schemer Magazine, world's oldest mailorder publication. Box 275M, Canfield, Ohio. Year \$1.00. Sample 20c.

FREE Electroplating information. Money making plans. Send postcard for your copy. Highly paid, interesting, uncrowded field. Plater M. Hyde, 327 West 120th Street, Los Angeles 61, California.

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PRINT Without printing press—Posters, banners, greeting cards, toys, glassware, neckties—anything! New "easy" revolutionary method. No special equipment or experience needed. Work full or spare time at home. No selling. We set up "your own local business." Wonderful money-making opportunity. Free sample. Profitable ideas, beautifully illustrated plan free. Write Screen-Print, 1010 South Los Angeles Street, Los Angeles 15.

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FREE Vending machines; if used to sell our profitable nuts. Continental, Box 1361-A, Milwaukee 1, Wisconsin.

MAIL Order opportunities. Write F. Tyler, 528 Piqua Place, Dayton 7, Ohio.

WHOLESALE Of sensational nationally advertised appliances, silverware, watches, cameras, etc. Start your own business. Full details. Send 25c for catalogue. International Sales Co., 175 Fifth Ave., New York 10, N. Y.

EARN Extra money with profitable home business projects, free particulars. Chamberlain, Box 894, Manchester, New Hampshire.

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PROFITABLE Home business, electroplating novelties, giftwares, auto parts, mirrors. Easy, inexpensive home processes. Free booklet. Tyco Metals, Box 13231-MJ, Houston 19, Texas.

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COLOR Concrete with chemicals. Marble-glaze cement benches, pottery, garden ornaments. Home — shop. 10c brings sample, pictures. Hollywood Cementcraft, 6527-R Wonderland, Hollywood 46, Calif.

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BIG Profits making new greaseless doughnuts. Start in kitchen. Wholesale to grocers and cafes. Free plans. M. Ray Company, 3605 South 15th Ave., Minneapolis 7, Minnesota.

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NEW Exceptionally profitable plans, ideas for home operated mail business. Rush name. Miller, 1772-P Carlyon Road, East Cleveland 12, Ohio.

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21 POPCORN, Candy apple formulas, proven money-makers. Send \$1 today for formulas, catalog of money-making ideas. Concession Supply, 3916 Secor, Toledo, Ohio.

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READ "Advance"—The voice of mail order. Offers money-making opportunities, sources of supply, personal guidance, etc. Issued monthly. Sample copy 35c. Yearly subscription \$2.00. Advance Publishing Company, 313 East 21st Street, Suite 450, New York 10, N. Y.

GOOD Paying business silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late method. No tanks or shop required. Outfit furnished. Free booklet. Gunmetal Co., Ave. H, Decatur, Illinois.

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COPUBLISH Leading m.o. paper. Latest copy. Mail Sale Advertiser, details, dime. Vanroy Shirk, Lebanon, Penna.

COLORGLAZED Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries Company, Grand Rapids, Minnesota.

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POPCORN And potato chip equipment. Long Eakins Company, 5360 High, Springfield 99, Ohio.

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START Venetian blind laundry. Profitable lifetime business. New machine. Free booklet. F. C. Co., 442 N. Seneca, Wichita 12, Kansas.

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MAKE Money from newspaper clippings. Siegel, Box 183 PM, New York 2.

137 PLANS For starting home business. Details: Elite Co., 220 Grand St., New York 13.

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INSTALL Hand railings on stairs, terraces, porches. Unlimited applications. Provides safety. Cast aluminum universal joints lock with set screws. 1½ inch aluminum tubing will not rust. Easy to assemble. Fits any angle or grade. Install in wood, stone, ground or concrete. Profitable. Send for folder. Kloppenborg Aluminum Foundry, Dept. PMC-3, Davenport, Iowa.

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GROW Miniature dwarfed trees, instructions 50c. Metro, Box 103A, Berwyn, Illinois.

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READ Progressive Mailtrade, the magazine that tells how to make money by mail. Dime brings sample and special offer. Progressive Mailtrade, Box 357, Sheboygan, Wisconsin.

FREE Book "505 Odd, Successful Businesses." Work home. Expect something odd! Pacific, Oceanside, Calif.

SPARETIME Profits taking subscriptions, all magazines. Wholesale catalog free. Cassell Agency, Westfield 2, New Jersey.

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LEARN Plastics at home. Small cost—Spare time. Dime brings sample plastic, three experiments, full details. Plastic Projects, Box 5151, Detroit 35, Mich.

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TERRIFIC Bargains—Profits! Used suits \$1.75, pants 35c, dresses 20c, shoes 20c. Operate from store, home, car. Free catalog. Superior, 1250-A Jefferson, Chicago 7.

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SELL Perfumed stationery by mail, stores, homes. Sample, details free. Rienzi Press, 24-P North Seventh, Newark 7, New Jersey.

COMMISSION Salesmen to show novelty saw to hardware retailers. W. Ireland, Box 145M, Auburn, N. Y.

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REJUVABRUSH—Makes paint-hardened brushes soft, pliable. Reusable, harmless, mild to hands. Guaranteed. Fast seller, wonderful profits. Amazing proof free. Chemtech Laboratories, 2845 South 34th Street, Milwaukee.

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KILL Flies, insects (all kinds) instantly. For homes, restaurants, hotels, hospitals. Amazing (low priced) invention. Whirlwind seller. Tremendous profits. Walco Industries, Dept. 43-C, Highland Park, Ill.

ABSOLUTELY Free—Sales kit. Yours for the asking. Send postcard today requesting kit showing new line, belt buckles with your name or personal initials, cap badges, choice 3000 different emblems. Write Hook-Fast, Box 1425PM, Providence, R. I.

FREE Samples. Big profits showing amazing "Glow-in-the-dark" specialties. House numbers, pictures, plastic novelties, ashtrays, keyholders, religious and nursery objects, etc. Madison Plastics, 303 Fourth Ave., New York 10, N. Y.

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53 WHOLESALE Dealer kit on appliances, typewriters, recorders, cameras, giftware, etc. Free. Write Arrow Distributing, 154-B Nassau, Street, New York.

BIG Profits selling sensational engine oil-vuer. Every motorist hot prospect. Details free. Rogers Automotive, Box 23, Station C., Pasadena, California.

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SELL Fast—78c Baby necessity. Big repeater. Baby Gay, Beaver Dam 8, Wis.

EXTRA Money. Easy-selling repeat attractive items; imprinted napkins, guest towels, new soap and towel sets. Also unusual fast-selling gift creations. For quick profits write for free samples. Nancy Lee Novelties, 22 Wooster Street, New York City.

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COSTUME Jewelry will bring you fabulous profits, easy sales! Our terrific line includes popular-priced Coronation jewelry! Send for catalog and wholesale prices—for re-sale only! Penn Jewelry Co., Dept. P, 826 W. Lacka, Ave., Scranton, Penna.

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IS \$210 A week worth a postcard to you? Then rush card with name and address for special free trial plan that sells amazing new automatic refrigerator defroster "like hot cakes!" Write to Mr. Lewis, D-Frost-O-Matic Corp., Dept. A-102, 173 W. Madison, Chicago 2, Illinois.

POSITIVELY Make \$50.00 a day and up selling brand new item going to every type of food and beverage store, factories, laboratories, hospitals, etc. Samples furnished. Utility Durawear, 53 West Jackson Blvd., Dept. PM-4, Chicago, Illinois.

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BARGAINS—Terrific savings. Job lots. Close-outs! Also save up to 50% on dry-goods, clothing, hosiery, notions, drugs, toiletries, gifts, jewelry, television, etc. 2000 items. Send 25c for wholesale bargain catalog with special "get acquainted" offer which includes free \$1.00 merchandise certificate. Reliable Jobbers, 311-B North Desplaines, Chicago 6.

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SCHOOL Seniors—Earn sensational profits selling classmates America's most beautiful graduation name cards. Largest selection. Outlets all others. Free sample kit. Printcraft, Dept. M, 1509 Maple St., Scranton 5, Penna.

AGENTS—300% Profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co., 431-D North Clark, Chicago.

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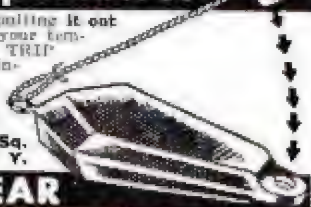
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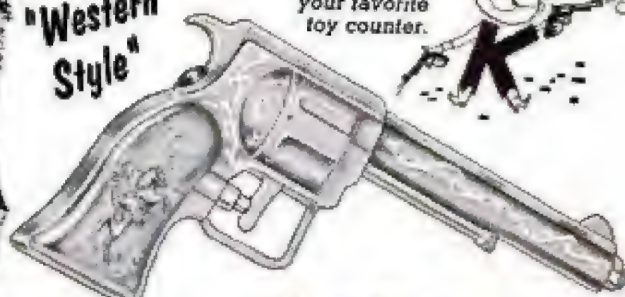
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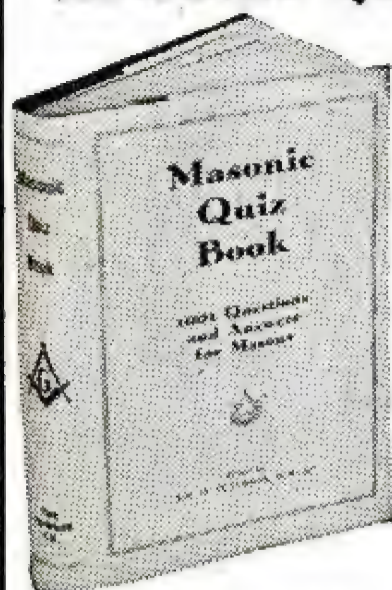


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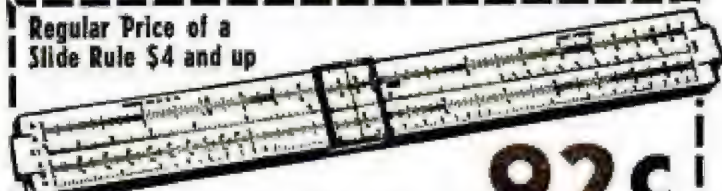


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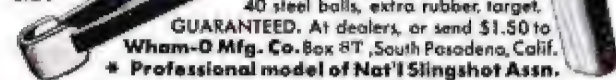
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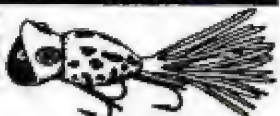
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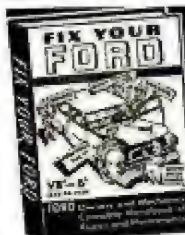
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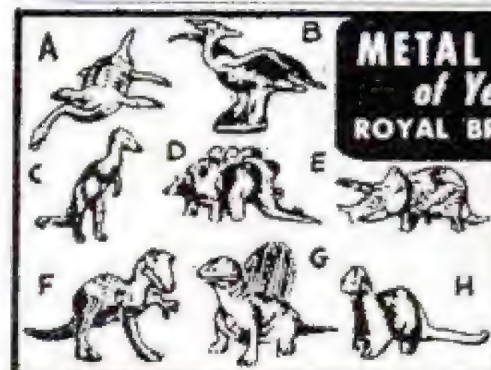
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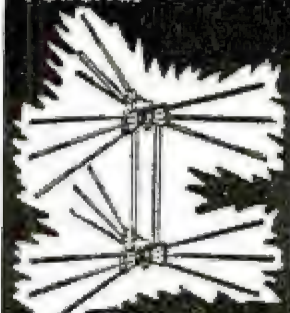
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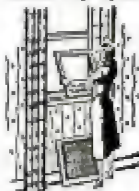
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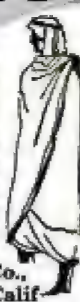


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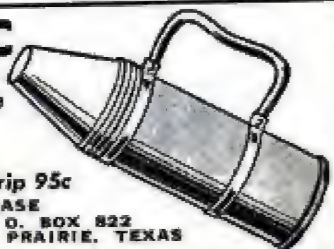
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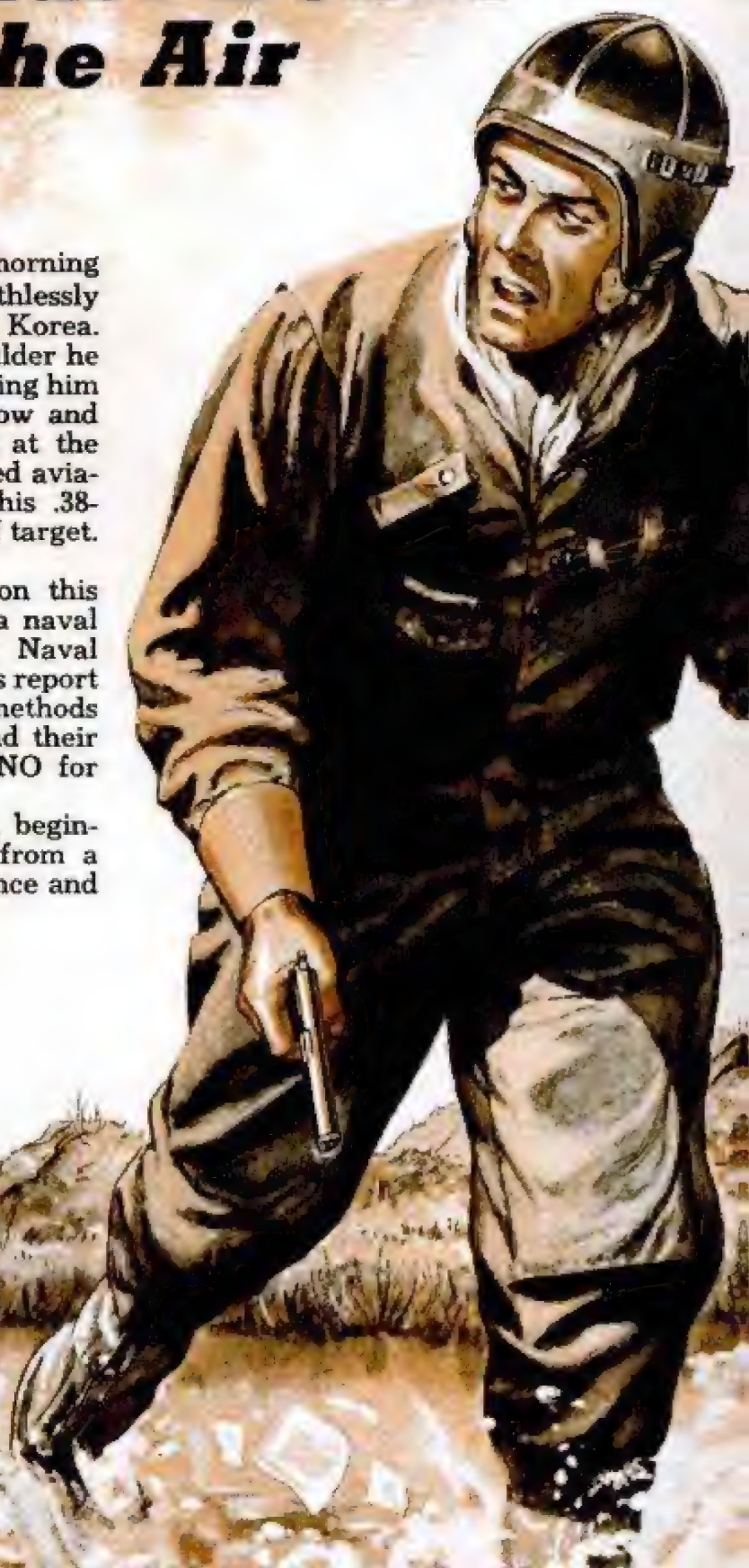
They Outsmart Death in the Air

By Frank J. Madden
Chief Journalist, USN

IN THE EARLY LIGHT of a winter morning a naval fighter pilot was running breathlessly over the frozen rice paddies of North Korea. Every time he looked back over his shoulder he saw a monstrous Communist soldier stalking him "with an easy half walk, half lope." Now and then the soldier would stop and shoot at the fleeing airman. Only once did the downed aviator return the fire. Three shots from his .38-caliber automatic. All tracers. All wide of target. After that his gun froze.

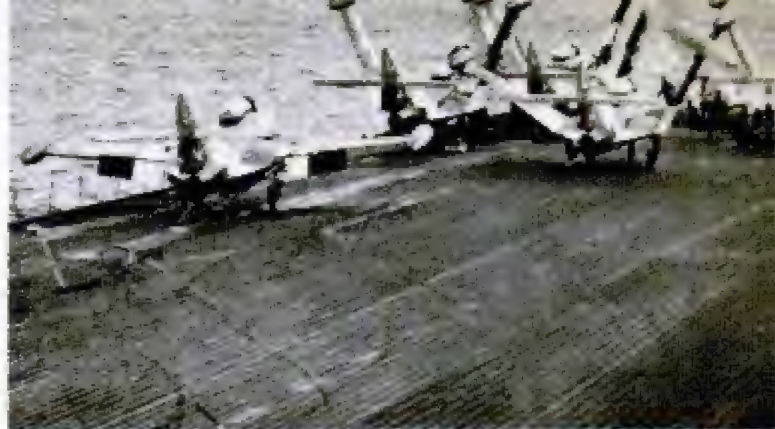
Within 96 hours a complete report on this pilot's experience was in the hands of a naval safety representative of the Chief of Naval Operations in Washington, D. C. From this report a group of veteran pilots studied the methods and evading tactics used by the flyer and their recommendations were passed on to CNO for final action.

This report was thoroughly discussed, beginning with the launching of the plane from a carrier at 0530 on a weather-reconnaissance and heckler mission.





These photos are of a single training accident on a carrier. Here pilot crashes through a barricade



Plane moves along at high speed toward the craft parked on the deck as pilot tries to avert crash



The crash — four other jet aircraft are damaged Plane goes overboard taking two other jets along
Damaged jets afloat alongside carrier. Cause of accident: Pilot tried to land despite "wave off" signal



It was learned the pilot started on a routine predawn mission on the east coast of Wonsan-Hungnam area where the Navy's fleet commander knew the Reds were using roads and railways to ship in supplies and ammunition to front-line troops.

When the pilot's plane was airborne he headed for the target area, with a second plane flying wing. They reached the beach and completed their weather assignment without incident. As the wingman peeled off and headed in a northerly direction he quipped over the radio, "Good hunting!"

The pilot of the lead plane headed west and was 10 minutes' flying distance from Wonsan when he spotted, in the darkness below, 30 or 40 trucks with lights burning. His altimeter showed 7000 feet as he started his dive. Upon hearing the roar of the engine the trucks quickly doused their lights.

Two of the truck drivers must have been doping off, for as he circled, making certain he was over the convoy, their lights continued to burn. The convoy had been brought to a halt; playing possum, thought the pilot, hoping the darkness would conceal them.

He glided in for the attack, strafing the entire area around the lights. In the eerie light made by his tracers and bursting shells the pilot saw what appeared to be smoke and assumed he had damaged a few of the trucks.

He gunned his engine to regain altitude and have another look. Three trucks had turned on their lights and were hurtling down the road in an effort to escape. This time in addition to strafing, the pilot made two separate bomb runs. With so many targets to pick the pilot maneuvered crazily to get a shot at most of them. He called his wingman and told about the trucks. Cutting in on his channel came the excited chatter and cursing of dive-bomber pilots from his own air group as they worked over a train chugging toward the safety of a tunnel. He decided to have a look at the Hamhung and Hungnam areas where the others were operating.

When he arrived the dive bombers had made a mess of scrap metal out of the engine. The wingman joined him now and they left the dive bombers and went hunting south of the city.

The lead pilot discovered a nice juicy target—a whole large bridge—and made a run on it letting go his last two bombs. He pulled out about 2500 feet and was well in his recovery when he felt a jolt.

He was hit by the first burst of anti-aircraft fire. The battery of AAs had let him dive in close before they opened up. When they saw smoke trailing from his plane they really went after him. Tracers were bursting all around as he circled to avoid

going over Hungnam which was studded with anti-aircraft and flak would be heavy.

He finally got out of range of the exploding shells and headed, he hoped, for the water and safety of Navy ships. He pushed the throttle to the firewall but the plane continued in a glide. He figured, "This is it," and commenced preparation for ditching the plane.

He switched to the guard channel on his radio and transmitted, "Boys I'm hit and trying to make the water."

The wingman "rogered" the emergency call with, "I got you."

The dead-engined plane had gained altitude on pulling out of its dive and was nearly at 3000 feet. The pilot kept heading due east and sweated out every inch of ground he passed over. He kept thinking of the command ship and if it had a helicopter on its way to pick him up.

This proved to be a correct assumption. His wingman immediately switched to the guard channel and gave a detailed report as to where they were and the extent of damage to the plane. He also asked the aircraft carrier to set up a Rescue Combat Air Patrol (ResCap) operation.

One of the command ships in charge of close support, bombarding the Commies in the area, sent out the following dispatch: "Bird Eye from Rover Boy. One downed pilot in area AXGH4624. Send windmill. Over and out."

Heading into the beach the helicopter pilot notified a destroyer to have a doctor standing by. ResCap planes joined the helicopter as escort.

In the meantime the damaged plane began to lose altitude and fire broke out under the cowlings and in the gas area. The pilot had to ditch fast now as he was too low to bail out and flames were licking back toward the cockpit. Coming in low he saw some power lines he could not clear but they gave way upon impact and he hit the ground with wheels and flaps up. The landing was smooth enough, but he experienced the thrill of riding a rapids in a light boat as the plane bucked and twisted, plowing through a dozen irrigation-ditch embankments.

He was struck by the terrifying thought that he had forgotten to jettison the plane's empty belly tank and to open the canopy. An explosion, followed by fire and himself trapped in the cockpit flashed before his mind.

Luckily there was no explosion and he had no difficulty opening the canopy manually. He jumped clear of the flaming wreckage, and ran about 15 yards to an irrigation ditch. In his haste he had left his parachute, which was contrary to advice given by his briefing officer because



Photos on these two pages show what happens when jet pilot makes too low an approach. 1. The plane crashes into ramp. 2. Momentum raises fuselage as craft breaks in two. 3. Nose and cockpit on deck

of its many uses in evasion and survival. Any thought of recovery was dispelled by the raging flames and the thought of the gas tank blowing up.

Resting on his elbow, he sneaked a look around, surveying the surroundings, and thinking of what to do next to get back to his ship. He saw the wingman's plane dive low over the burning plane and thought happily that he was seen as the wingman wigwagged his wings. The wingman never did see the pilot nor did any of the ResCap until much later.

The accident report pointed out "The light was poor in the early dawn. This prevented the ResCap seeing him. In fact the pilots orbiting above the ground didn't see anything but the burning plane. A downed pilot must do everything possible to identify his location."

Official U.S. Navy photographs

4. Flight deck is engulfed with smoke and flames as wreckage comes to halt after spewing aviation gasoline the length of deck. 5. Fire crew goes into action to save pilot and quickly put out the fire

There were buildings cutting off the pilot's route to the water and he knew he would have to go around them rather than take a chance of going through town. A couple of hundred people gathered on the outskirts watching the burning plane but made no move toward him. The pilot didn't fear them, believing they were civilian farmers.

He was startled out of his reverie, though, by a Communist soldier who had sneaked in behind him and was now only a hundred yards away.

He bolted out of the ditch and headed west with the trooper in pursuit. The Commie did not fire at first and the pilot, already breathing hard from pure alarm, kept worrying if the first bullet would find him an easy target. In his horrified desire to escape he paid no heed to the ground





and fell in holes and ditches, stumbled to his knees, got up, ran again and fell again. The soldier continued the chase in a monotonous trot.

The only time the pilot could gain was when he would stumble across a water-filled irrigation ditch, protected from the ice-cold water by an antiexposure suit which had just been issued to him. This exposure suit originated as a result of accident reports which related the deaths of pilots due to exposure in frigid weather. The suit had an inner section which absorbed perspiration and rubber-cemented boots with a trouser combination which protected his legs and prevented ice, snow or water contacting the feet.

The pilot, sensing his pursuer's reluctance to dash through the icy water, purposely picked out sections of rice paddies that were badly flooded. Since this was rugged going, because of the muck and broken roots, he took to diving across ice-covered ditches on his stomach. The ice in many instances was not thick enough to hold his weight.

A second soldier joined in the race and

he was either unarmed or failed to fire as the pilot didn't recall anyone but the first Commie firing. Still, more bullets seemed to be kicking up the snow around his feet.

By now it seemed to the pilot that he had run halfway across Korea. Actually the distance was about three miles.

With the increase in firing, the pilot determined that they meant to kill him and should he fall and not be able to rise, they would put a bullet through his head. This spurred him on; everytime he heard a "ping" he would duck sideways and try to put greater distance between himself and the rifle. The pilot had run for nearly an hour.

When he fired his gun and it froze, he realized it was a miracle that he even got off three shots for it was muddy, wet and coated with ice. He beat on the gun mercilessly to free the cylinder release. It was to no avail and he attempted to force the hammer back to fire the remaining shells in the chamber but this also proved futile. When the Commie saw what he was attempting to do he would let go a few shots.

(Continued to page 278)





It takes 90 tons of crushed ice to cover Belknap ski run (above). Ski-club members start work in the small hours of the morning, finish job by covering run with insulating layer of straw. Just before meet starts, they wade in, carefully rake it off (right)

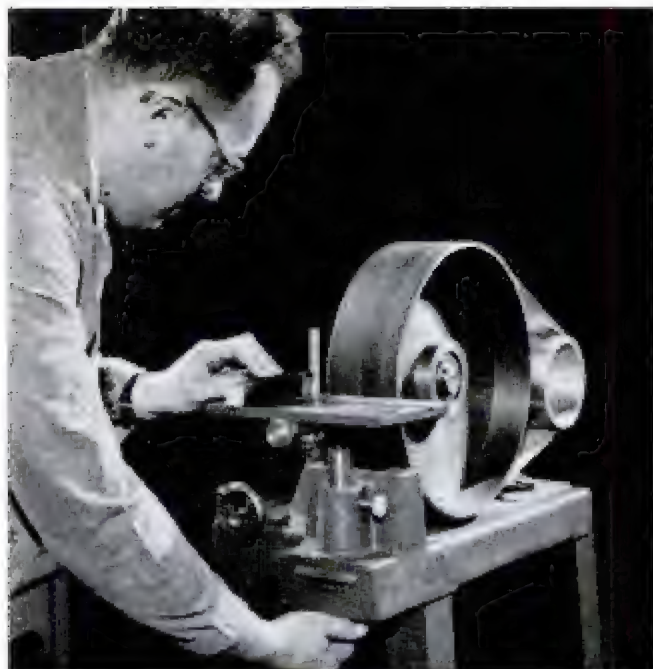


Skier ends thrilling ride with head-over-heels plunge through strawstack (above). Carpet of straw at base of slope slows speeding skiers, cushions fall. Skier (below) takes to air as hundreds of spectators at bottom of hill hold their breath

Midsummer Ski Meet

SKIING is so popular around New Hampshire's famed Belknap recreation area that people can't forget the sport even when it's 90 degrees in the shade. Comes midsummer, the urge to ski is so strong that action is taken. Ninety tons of ice hoarded from the previous winter are chopped and scattered down the Belknap ski run, and the biggest tournament of the year is staged in blistering summer heat. Members of the Winnepausakee Ski Club start preparations in January. Ice is cut from one of the frozen lakes in the area and stored in a local icehouse. When tournament time comes, it's trucked to the site and chuted down the hill, packed down with skis and garden tools and covered with protective straw until the meet begins.





Silicon-Carbide Tool Grinder

Tungsten-carbide tools, so hard they are usually sharpened with a diamond wheel can now be ground and honed with an abrasive belt of silicon-carbide paper. The belt rides on a 14-inch cast-iron contact wheel specially made for extreme hardness. Two steps in the traditional grinding process are eliminated by the new method, which is said to cost less and double the life of cutting edges.



Baby Harness Prevents Falls

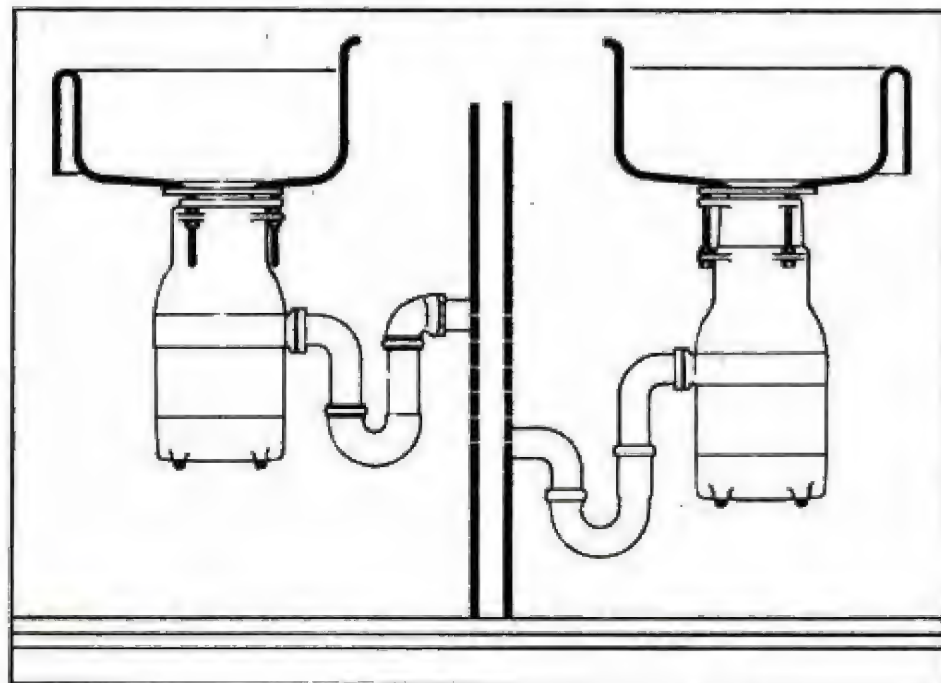
Small children stand a better chance of surviving automobile accidents if they're anchored to the front seat with a new safety harness. Quickly hooked over the back of the seat, the device mounts a heavy-duty spring which breaks the force of sudden stops and prevents the web harness from snapping. An adjustable snap on the harness allows the child to stand, sit, lie down or move about in comfort.

Telescoping Food Disposer Easily Installed in Most Sinks

Expanding or telescoping as necessary, a food-waste disposer now available fits almost all sinks. Although it has a full-size shredding chamber, the unit can be roughed-in six inches below the sink. If necessary, the roughed-in range can be ex-

tended to 11 inches. The unit has only one moving part, automatically reverses itself and has a self-service features that permits the average householder to relieve jammed conditions. The unit appeals especially to those who move often.

Diagrams show how unit expands or contracts to fit available space. Right, unit has reversible shredders



By F. Leland Elam



On museum visits, young lady learns that "Porgia" porcupine's favorite food is corn on cob. Left, museum provides cages for animals

Want to Borrow a Porcupine?

Gophers and indigo snakes, foxes, skunks and many other animals can be checked out of the "lending library"



IMAGINE WALKING into a museum and stepping out again with a wild animal to take home and keep for a week. That unique service is available to boys and girls in Sacramento, Calif. There the California Junior Museum operates, as part of its Live-Museum Program, an animal "lending library" where a child, seven years old or older, can borrow a pet without charge for a week at a time.

There are over 60 animals for circulation in this library. Included are skunks, porcupines, possums, foxes, jack rabbits, squirrels, turtles, white rats, white mice; a wide variety of birds such as a screech owl, horned owl, sparrow hawks, linnets, sparrows, blackbirds, crows, magpies and a large variety of lizards and nonpoisonous snakes. Also in the Live Museum are a large number of animals and birds which have not been "home conditioned" to a point where they can be taken out of their cages and handled by the youngsters. From 20 to 40 animals, birds and reptiles are loaned each week.

The animal lending library was created for a number of purposes. First, so all children could have the opportunity of caring for an animal pet; second, because children should become acquainted with native

animals — impossible for some youngsters who have little opportunity to get to the woods and fields; third, in the interest of humane education; and fourth, to teach children the proper care of native animals.

Animals are loaned not only to the children, but also to hospitals to entertain children who are ill. Library animals are often borrowed by school teachers for use in their classes.

No child is allowed to take out an animal until he has filled out an information card, so museum officials will know he is in a position to give the animal proper care and attention.

For instance, if a child wants to take out Blossom, the skunk, he must know that Blossom can be fed eggs, milk, meat, dog biscuits or vegetables; that she can be fed just as much as she will eat, for she will stop eating when she is full; that she must be fed once a day in the evening.

The child must know that Blossom, when placed out of doors in her cage, should be put in the shade and at no time left more than 10 minutes in the sun. In the house she should not be in a draft, and she needs an even, moderate temperature.

Blossom, he must know, should be picked up by putting hands under the hind legs



These kids tote home a cage of white rats. No trouble — they must have parent's permission



Right, intrigued by turtles, youngster must have a pond before she can check out her favorites



At home, jack rabbit gets lavish treatment. Girls soon learn it prefers spoon-fed applesauce to carrots

Before checking out owls, girls must fill out form to prove they know how to take care of the birds



and the chest, that she shouldn't be handled more than a half hour at a time, before feeding, not when the temperature is hot and no more than three to five times in one day.

The borrower must know something about the history of the animal—in the case of Blossom that she is a native of North America and other parts of the world.

He must know whether the animal he wants to borrow lives in caves, dens, trees, on the ground or burrows under the ground.

The child can't bluff his knowledge for each animal requires a different set of answers. If the questions are not answered properly the animal is not loaned.

The child must also submit a form signed by a parent, granting permission to borrow one of the animals and giving assurance the parent will be personally responsible that the child follows instructions for the care and attention of the animal. The parent must also agree to provide whatever is necessary to maintain the animal while it is in the home.

No youngster is allowed to take home an animal unless he is a regular visitor of the Live Museum. The library staff thus can make certain the child is properly qualified to take one of the animals.

And where can boys and girls who are interested in borrowing wild-animal pets learn about them? Right in the Live Museum. There they can handle the animals, watch their feeding and care. ★ ★ ★



Water jet saturates sand beneath vibrating packer. Right, big tube on crane packs column 12 feet deep

Earth Compactor Permits Construction on Sand

Built upon sand, a Florida chemical plant will rest on solid pillars of compacted soil produced by action of a packing device. A huge tube which is vibrated by an electrically driven unit inside it, the packer produces a centrifugal force of 10 tons. Suspended from a crane and guided by vertical timbers, it is lowered into the sand while a water jet at its tip forms a saturated sand mass into which the vibrator sinks. Low-



ered to a depth of 12 feet or so, it is withdrawn and fresh sand added in one-foot stages until the hole is filled with compacted sand. Result is a solid column of sand eight feet in diameter, able to bear heavy loads and resist shock and vibration. Engineers say the process can be used for many construction purposes in sandy areas.

Midget X-Ray Unit for Industrial Applications Weighs 150 Pounds



Compact design, reducing bulk to $\frac{1}{2}$ and weight to $\frac{1}{8}$ of conventional units, makes a portable X-ray machine easy to carry to the job. Operating at 75,000 to 250,000 volts, the 150-pound machine can X-ray steel up to $3\frac{1}{2}$ inches in thickness. It is only 15 inches in diameter and 44 inches long. Because of its compact design and protruding, ray-emitting snout, it can take "inside out" X-ray pictures. This is accomplished by carrying the unit inside the object to be X-rayed and directing the snout against the area to be photographed. It works on metals from magnesium to steel.

Sources of available products described in this issue are indexed on pages 12, 14 and 16. Sources of further information on other articles are listed in the WHERE-TO-FIND-IT LIST, which is available to readers without charge from the Bureau of Information, Popular Mechanics Magazine, 200 E. Ontario, Chicago 11

Motor-Assisted Bicycle Mounts Engine Over Front Wheel



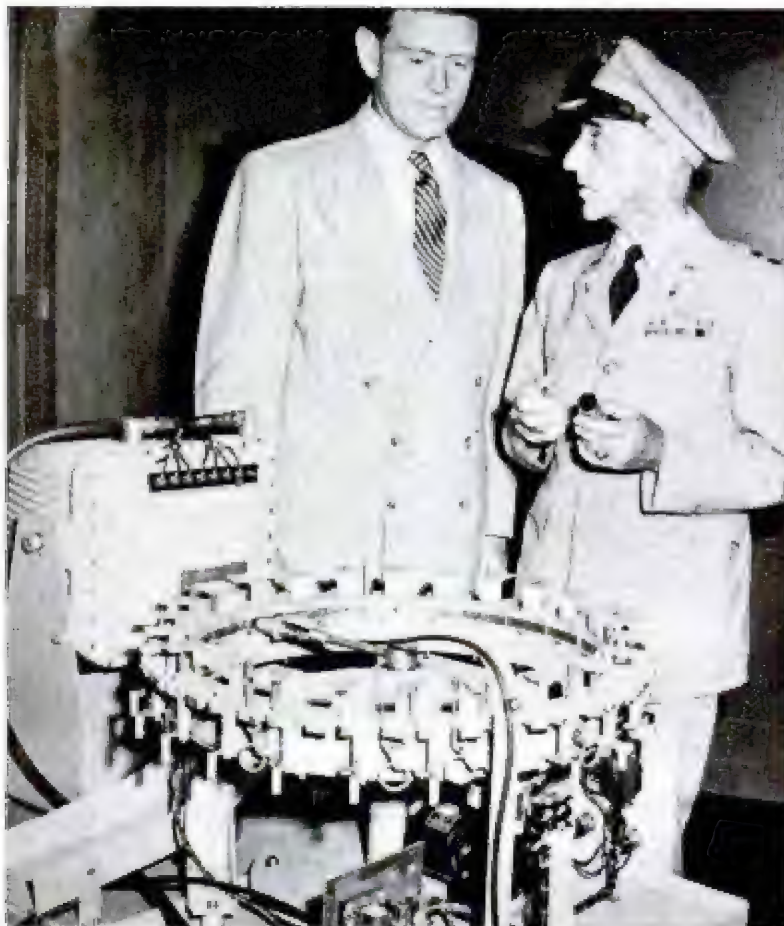
Powered by a tiny motor mounted above the front wheel, a bicycle of European design rolls along at speeds up to 18 miles per hour. The motor has only three moving parts: Piston, connecting rod, and a crankshaft mounted on ball bearings. There is no clutch or transmission and no need for lubrication. A silicon-carbide abrasive roller in contact with the front tire propels the cycle; speed is controlled by a thumb throttle on the handle bar. Disengagement of the motor is quickly and easily accomplished.

¶Fourteen stories high, a porcelain-enameled-steel church steeple in Birmingham, Ala., is said to be the first of its kind.

Hand-Grenade Fuses Inspected Automatically by X-Ray Machine

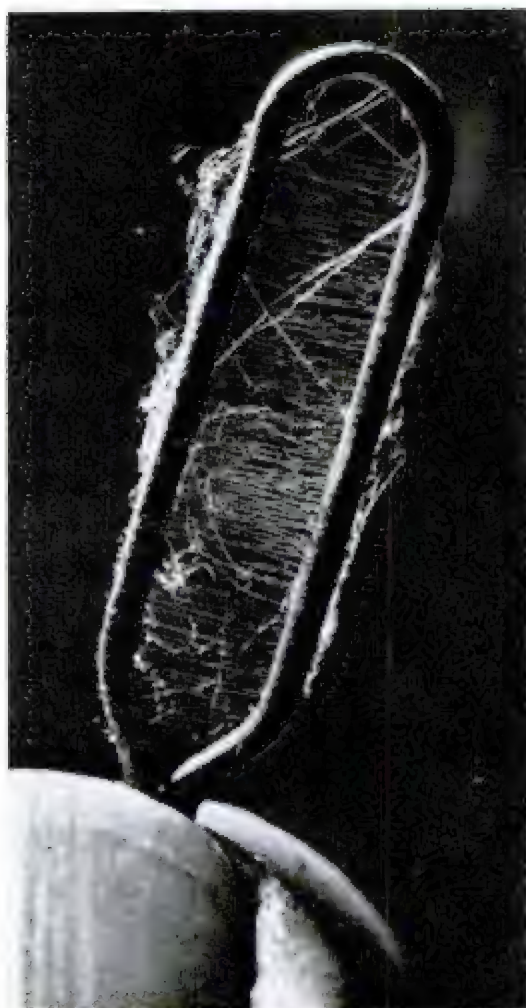
Soldiers' lives will be saved by an automatic fuse-inspection machine for hand grenades that eliminates human error by using sensitive cadmium sulfide crystals as

X-ray detectors. Rays from a 100,000-volt X-ray unit are directed through the fuses as they pass between the X-ray tube and the crystal detector. If the slow-burning powder is not packed in the fuse to the correct height, too many rays pass through the fuse and excite the valvelike crystal. It passes current to a mechanism which throws out the defective fuse. An insufficient amount of the time-delaying powder causes premature explosion, possibly in the soldier's hand.



Traffic "Diary" For Automobiles

Recording all stops, starts and speeds of an automobile as it moves through traffic, an electrical device is being used to analyze traffic flow. Developed at the University of California, the device also has push buttons which are operated to register the cause and location of delaying factors, such as intersections, pedestrians, signals and double parking. These factors are registered in code on a chart. The whole unit is operated by current from a generator driven by the speedometer cable.



Resin fibers are finer than spiderwebs, can trap even the microscopic particles of cigarette smoke

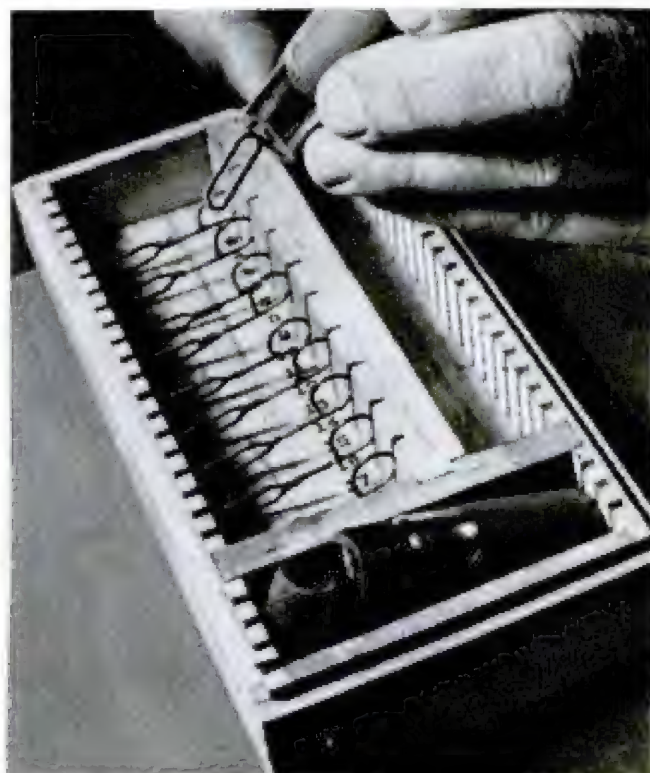
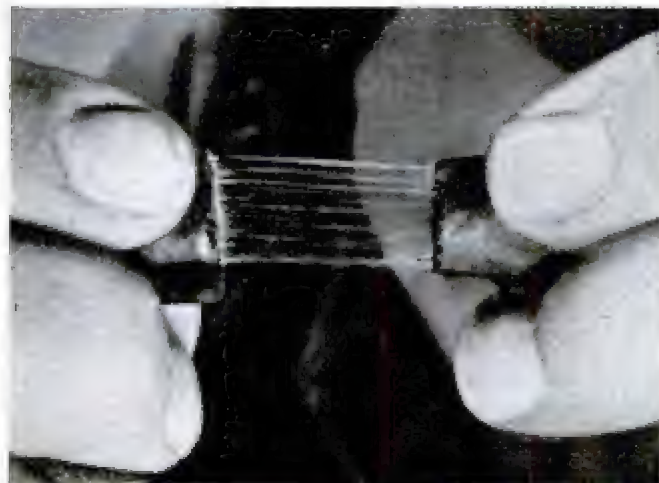
Scientists Snag Smog With "Spiderweb" Filters

Smog, the hazy screen that obscures large cities from coast to coast, consists of billions of microscopic particles which must be collected and analyzed if scientists are to discover their sources. Collection is difficult because the finest particles tend to drift through instead of clinging to a conventional filter. Paul Magill, director of the Air Research Laboratory of the Stanford Research Institute, solved the collection problem with a filter fiber finer than spiderweb. A tiny drop of resin is smeared between two rubber stoppers, allowed to dry for half a minute,

and pulled apart. The resulting web, stretched across a wire frame, can catch smog particles $\frac{1}{25,000}$ inch in diameter.

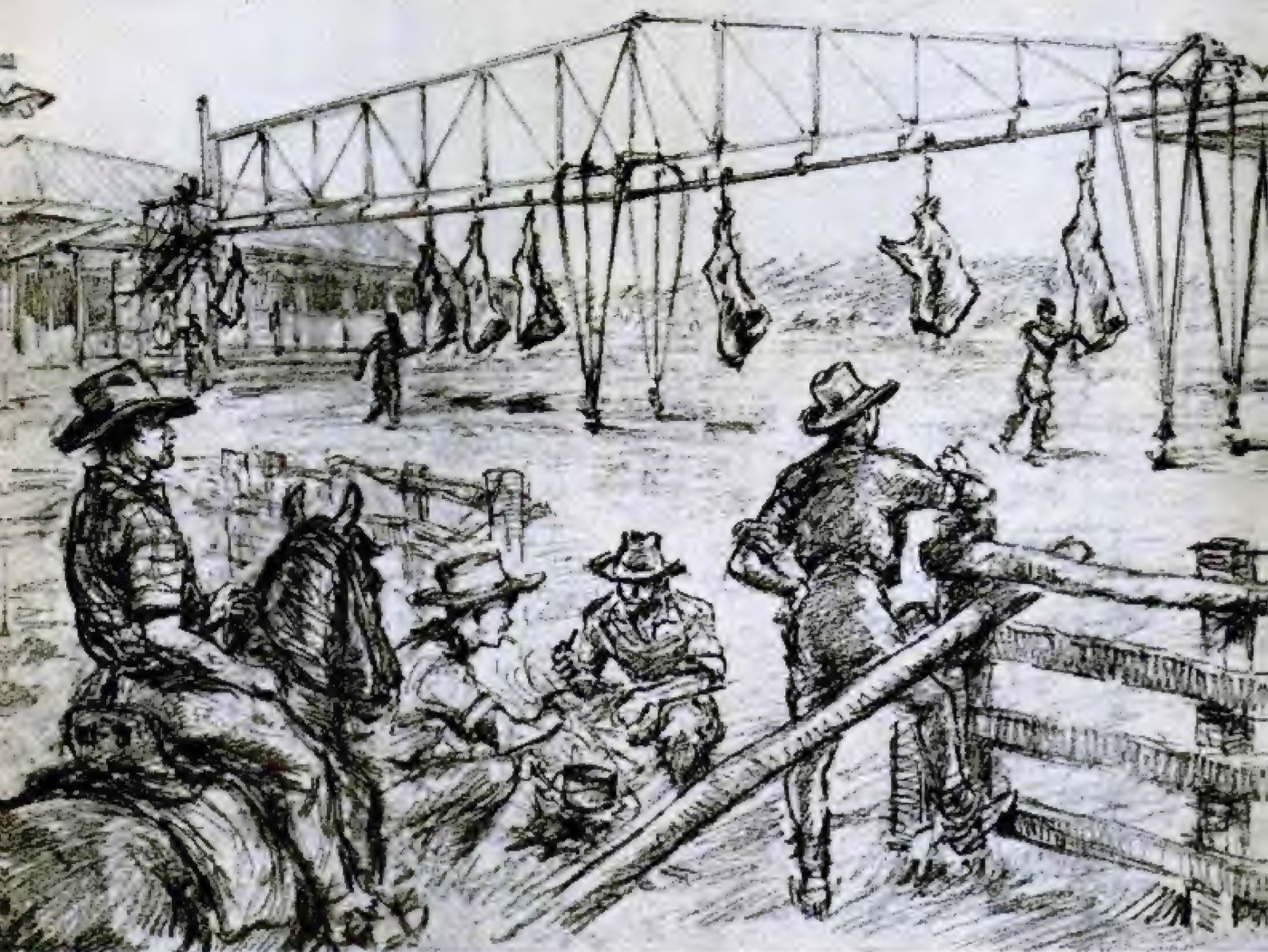
Field collection kits contain numbered filters for researchers who sample the pollution of city air

Thin film of resin is pulled apart to make filter





BEEF ON THE WING



BEEF IS TAKING WING to revolutionize Australian meat production. With no railways and only a few inadequate roads, the country's northern ranges have long been stymied in their growth as a cattle-producing area. Only old cattle could withstand the rigors of the long, overland trek

to coastal abattoirs, and even they lost weight. Moving the animals 300 miles took approximately 30 days. Now a private air-freight company, Air Beef, Ltd., is licking the problem. They first built an abattoir and refrigeration plant at Glenroy, in the center of the Kimberly region. From May to Au-



gust, the killing season, cattle are now driven short distances to Glenroy, slaughtered and immediately refrigerated. The frozen carcasses are then moved on an overhead trolley from the abattoir directly into a freight plane that flies twice daily to the near-by port of Wyndham. There the beef

is loaded into ships in prime condition, directly from the pasture. On return trips the freighter flies in stores needed around Glenroy. Pig farming and sorghum growing are being developed in the vicinity of the abattoir so that its waste products can be used locally to good advantage. ★ ★ ★

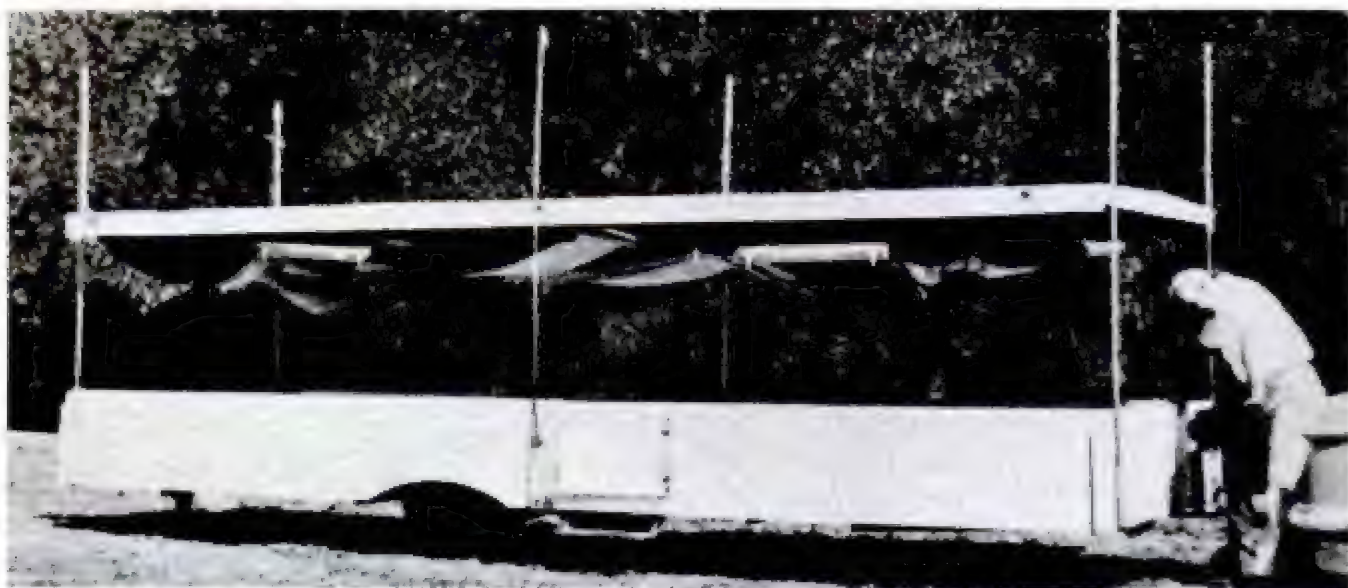


Long, low, two-wheel "tent trailer" easily follows car at speeds of 50 to 60 m.p.h. with boat lashed to top

Lightweight Trailer Collapses for Travel

When Cecil Beck of San Antonio, Tex., sets out on a hunting or fishing trip, he is accompanied by a long, low trailer that follows easily over the roughest roads but expands into a full-size living unit once the campsite is reached. The roof is raised from

the floor to standing height by means of a winch. Canvas walls fitted with plastic windows and a hinged door swing down from the roof and are anchored. Folding furniture, supplies, a gasoline stove and an ice-box are in a lower storage compartment.



Wooden standards are erected on sides and corners of platform. Masonite roof is raised from floor by winch. Within 30 minutes, Beck's "home away from home" is ready for occupancy. Interior measures 7 by 20 feet



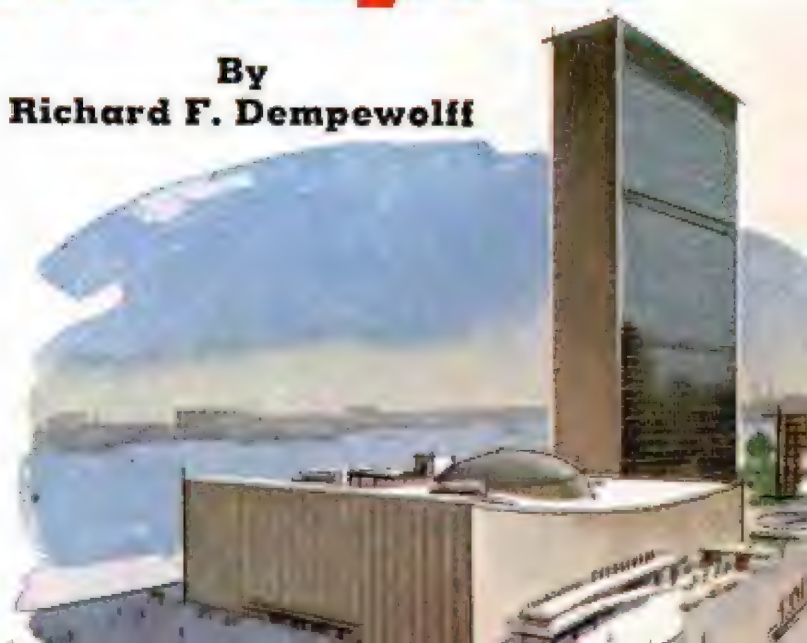


Assembly meets in its sparkling new home. Gold walls are wood slats that deaden sound to improve acoustics

UN's *World Capitol*

SOMBER LIGHTING in the United Nations' vast new auditorium slowly came alive over its first General Assembly meeting one day last October. A hush fell on the 2054 people wrapped in the dramatic inner shell of its 75-foot dome. Overhead spotlights set in the huge dome burned like planets against a night sky. Cold cathode tubes under wooden troughs on the rows of desks for the delegates blazed up in a sea of light below spectators, correspondents and observers, illuminating the rich blue, green and gold of the hall. Towering inward over the crowd were two startling inner walls of fluted, gold-leafed wood resembling the pipes of a gigantic organ. Two

By
Richard F. Dempewolff

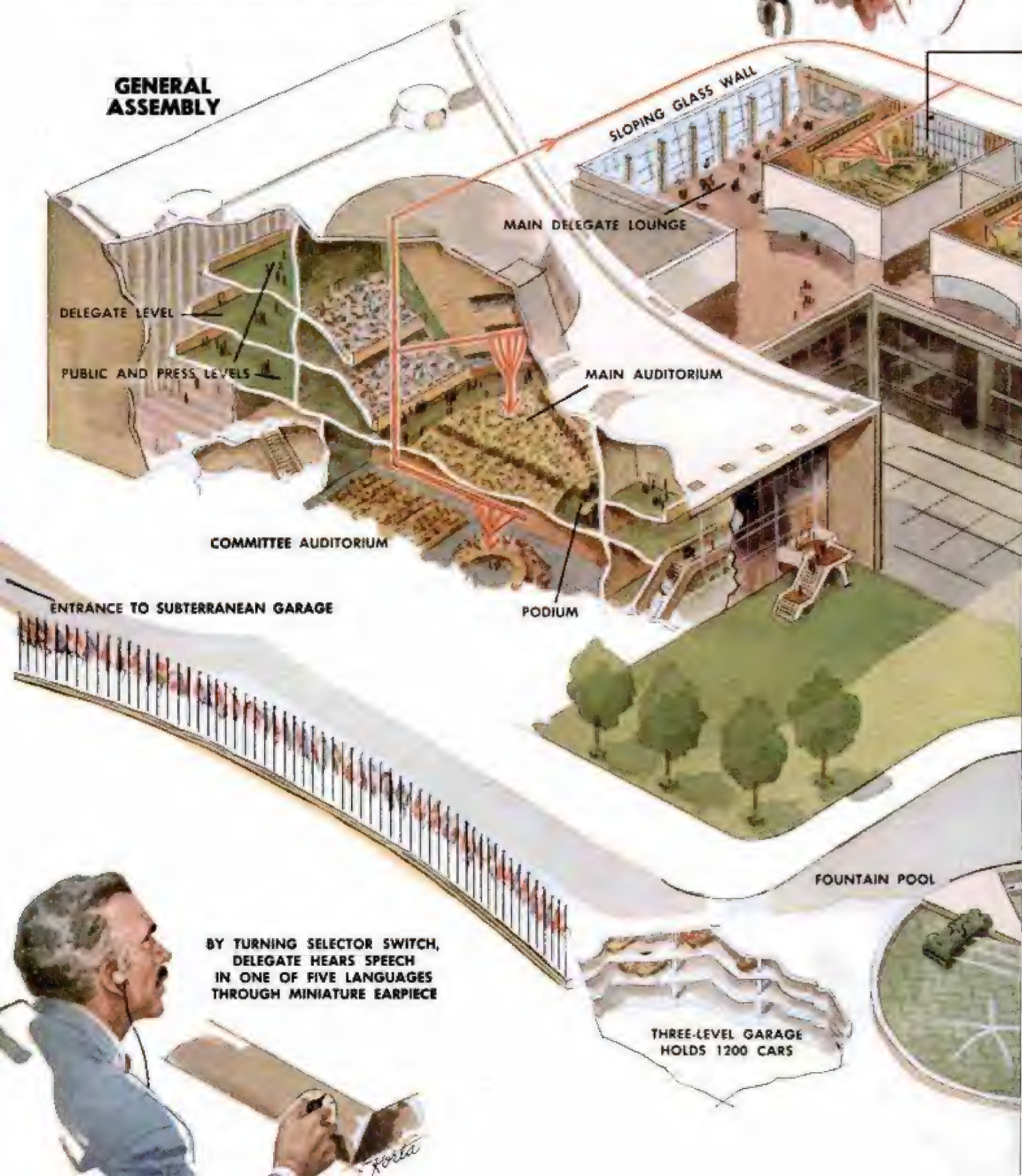


Headquarters for the world consists of three main buildings plus a library. Built on an 18-acre site along New York's East River, the "city within a city" cost \$67,500,000. An international team of architects and engineers designed the buildings. One of the many unique features is the electronic system, shown in red below, which permits any speech or debate to be broadcast in five languages simultaneously, and received almost anywhere in the three big buildings. Reporters can dial any of the conference rooms and receive speech then in progress

FIVE INTERPRETERS BROADCAST
TRANSLATIONS OF SPEECH



GENERAL ASSEMBLY



DELEGATE LEVEL

PUBLIC AND PRESS LEVELS

MAIN DELEGATE LOUNGE

MAIN AUDITORIUM

COMMITTEE AUDITORIUM

ENTRANCE TO SUBTERRANEAN GARAGE

PODIUM

SLOPING GLASS WALL

FOUNTAIN POOL

BY TURNING SELECTOR SWITCH,
DELEGATE HEARS SPEECH
IN ONE OF FIVE LANGUAGES
THROUGH MINIATURE EARPIECE

THREE-LEVEL GARAGE
HOLDS 1200 CARS

39-FLOOR SECRETARIAT BUILDING

ECONOMIC AND
SOCIAL COUNCIL

TRUSTEESHIP COUNCIL

SECURITY COUNCIL

DELEGATE LOUNGE

SIMULTANEOUS-INTERPRETATION SYSTEM

CONFERENCE
BUILDING

ESCALATORS

ELEVATORS

CUTAWAY SHOWS DELEGATE LEVEL
SECOND FLOOR

THREE COMMITTEE-COUNCIL CHAMBERS
IN LOWER FLOOR

ENDLESS BELT CARRIES DOCUMENTS
UP AND DOWN SECRETARIAT;
THEY ARE AUTOMATICALLY
EJECTED AT PRESET FLOOR

EAST RIVER DRIVE
GOES UNDER BUILDINGS

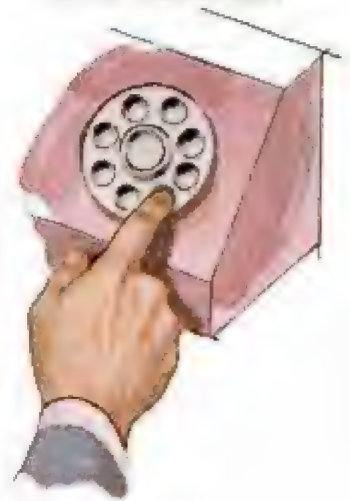
GARAGE ENTRANCE

PNEUMATIC TUBE CARRIES DOCUMENTS
BETWEEN SECRETARIAT AND LIBRARY

GARAGE EXIT

LIBRARY

REPORTERS CAN DIAL
ANY CONFERENCE ROOM
TO GET SPEECH FROM FLOOR
OR ITS TRANSLATION





Cantilevered balconies jut out over lobby, which is 75 feet high. Beams and girders become part of decor

rows of glass in booths in each fluted wall—for interpreters, radio and TV men and electronic-control men—caught brilliant reflections from the floor. They pointed to a massive panel behind the speaker's platform, where 60 concave gold shields—each three feet in diameter—will soon be emblazoned with the seal of each member nation.

Former Secretary of State Dean Acheson stepped up to the marble-fronted podium to give one of the first speeches. By touching a switch he could raise or lower the lectern to the height most suitable for him. Also on the lectern was a unique clock for long-winded speakers. Only 45 minutes showed on its face. Green, amber and red lights flashed time warnings at him.



Speaker in General Assembly can raise or lower lectern by pressing a button. Speech in his language goes . . .



. . . to glass booth where an interpreter receives it via a headset. She translates words instantly into one of the five official UN languages. Her words go through microphone to

. . . each delegate's desk. By turning a selector switch the delegate can choose the translation he desires. His earpiece, about the size of a hearing aid, plugs into receptacle in desk



After six years of restless wandering, the UN General Assembly was finally established in its permanent home—the last of three massive modern structures that cost \$67,500,000 and were hailed by former Ambassador Warren Austin as “The Capitol of Peace.”

The land on which these buildings sit was known as Turtle Bay Farm when, back in 1639, a Dutch colonial governor bequeathed it to a pair of English tobacco growers as a reward for fighting Indians. Today, the 18-acre site between 42nd and 48th streets along New York's East River is a controversial pile of plate glass, marble and towering steel.

Frank Lloyd Wright calls it “a perfect symbol of division.” Architect Paul Rudolph blasts its interiors as “a background for a grade B movie about one world!” To all comers, Wallace K. Harrison, who headed the international staff of 70 architects and engineers that designed the small city, rejoins: “We were not trying to build a monument, but the best workshop for peace in the world.”

For nearly a year, swinging steel demolition balls sent old tenements and warehouses cascading on the site. Mammoth shovels, gouging two tons of rock at a bite, dug 40 feet into Manhattan's quartz-mica underpinning while lumbering trucks carried away 213,000 tons of rock and soil to make room for deep subterranean founda-

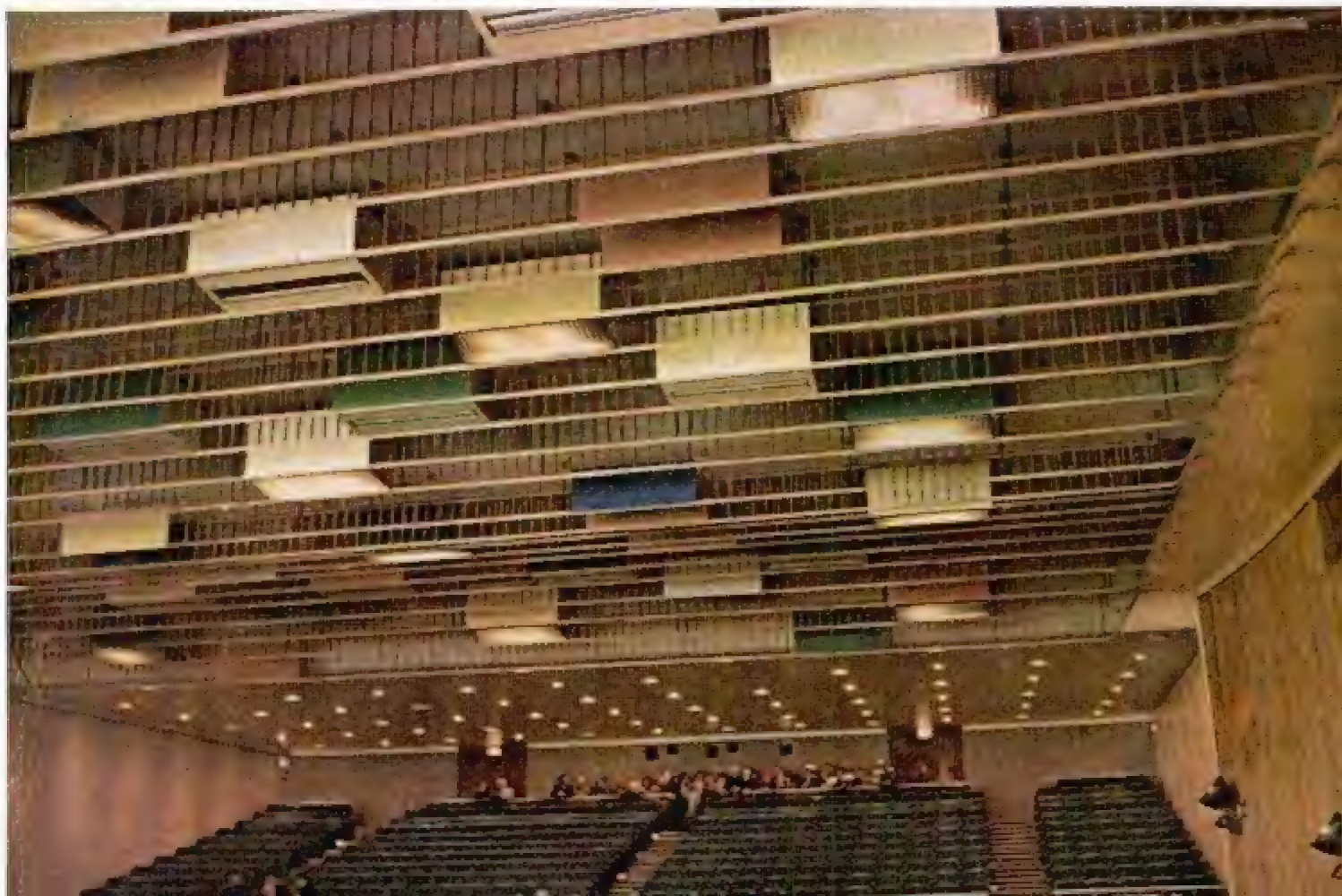
tions. One by one the unique buildings rose out of the great hole—sweeping dramatically along the river shore and overhanging Franklin D. Roosevelt Drive on large cantilevered beams. Cars disappear under the shelf of buildings at one end of the site and emerge at the other like ants creeping under a doorsill.

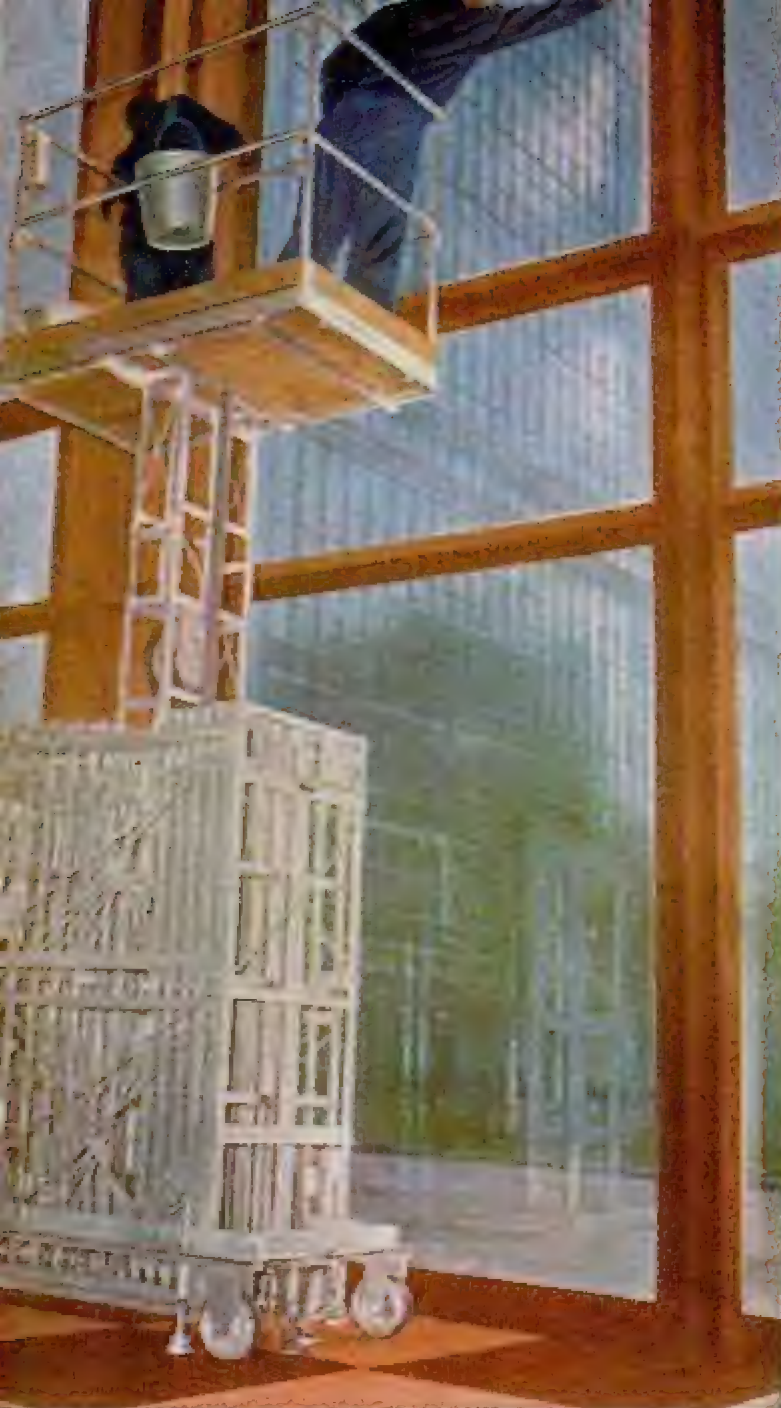
The 39-floor Secretariat, 72 feet wide, 287 feet long and 544 feet tall—a thin skyscraper resembling a book—dominates the scene. Here executive and administrative offices accommodating 3600 headquarters personnel are located. Its wide facades are sheer glass from top to bottom, made up of tinted windows to reduce glare, with black-glass spandrels between floors. The narrow sides are startling windowless walls of Vermont marble.

Connected to this building and running along the river edge like a hyphen between the Secretariat and the Assembly Hall is the five-story Conference Hall, a long (400 feet), low structure encircled by cantilevered balconies.

In its upper floors are three massive, lavish chambers stretching out 135 feet in length and half as wide. Here, under 25-foot ceilings, decorated with odd-shaped lighting and air-duct panels, the Security, Trusteeship and the Economic and Social councils hold forth around big horseshoe tables in front of the glass walls overlooking the river. Beneath these halls are three

Chamber of Trusteeship Council has exposed air vents in ceiling, splashed with color as part of decoration





Fourteen washers work endlessly to clean vast areas of glass. Telescoping platforms help them reach high points inside buildings. Below, dial right number in pressroom and get any speech in desired language



more committee rooms of equal proportion and three sub-basements.

Since the Secretariat is so tall and thin, its east and west faces catch plenty of wind and it sways a little. To keep this motion from cracking the walls of the conference hall where it joins the skyscraper's base, engineers employed a clever device. Conference Hall girders, instead of being rigidly secured to the Secretariat frame, rest on rockers under which are four layers of roller bearings. The skyscraper can teeter to all four points of the compass and those connecting girders merely ride in and out on their mounts leaving the Conference Hall still.

Joining the Conference Hall by a connecting corridor of plate glass is the most unique of all the buildings—the General Assembly. If you stretched a canvas tarpaulin from four corner poles, you'd get the general shape of the roof of this building. Just as the sides of the tarp would sag in the middle and curve in along the sides, so goes the roof of the big hall, pulling the English limestone sidewalls in with it. The flat south end, facing the Secretariat Plaza, is one vast recessed picture window set in a marble shadow frame. Behind it is the monumental lobby for delegates.

A visitor entering via the flat north end comes through doors in a wall of photosensitive glass set between marble columns. The glass has been exposed to simulate translucent marble. The visitor finds himself in a lobby 75 feet high and facing three cantilevered balconies. A hairpin-curved step-ramp sweeps up to the first balcony, leading on to elevators and public galleries of the auditorium.

All the interconnected buildings are so arranged that the press and public move through the first and third levels, bypassing the second. The second level, leading to the floors of all conference chambers is for exclusive use of delegates, who move directly to it via escalators in their special lobbies.

Unique architecture is only half the story of this fantastic "city within a city." You can see Architect Harrison's "workshop" function by following any UN employee through a typical day. George Sherry, for instance, is one of the interpreters—the one, incidentally, who most often translates Mr. Vishinsky's bombastic talks.

Sherry's boss, chief interpreter Nicholas Orloff, may assign him to cover a conference at, say, 10 a.m. At nine Sherry drives into the Secretariat Plaza, swings around the huge fountain and steers his car down a ramp that circles the fountain bowl, disappears beneath it and comes out in a tremendous three-level subterranean garage. He walks underground to the Secretariat and up a flight of stairs to the lobby. If he



Window-wall and big disklike holes in ceiling flood the Economic and Social Council chamber with light

wants a cup of coffee he'll take the glass-encased stainless-steel escalators serving the four lower floors up to the cafeteria. If he's going higher he'll head for the banks of elevators serving the various tiers of floors. There are no buttons to push. He touches his finger to an "up" or "down" spot painted on a plastic arrow. Static electricity in his body energizes electronic tubes which activate the switches and relays controlling the cars. He never waits long even in rush hours. The control system, set for any time interval by the starter to conform with traffic flow, regulates stopping time on each floor and keeps cars moving. If Sherry is passed up by a couple of loaded cars, a "forgotten man" relay automatically goes into action after about 60 seconds and the next car coming by in the opposite direction will make a special stop and take him where he wants to go.

Sherry's office is just a cubbyhole off the interpreter's lounge on the 17th floor. But it may change overnight. Every office in the building is made of floor-to-ceiling steel partitions that fasten to outer-wall brackets. A few hours' work can switch a whole floor plan from cubicles and corridors to one vast space. All utility conduits are easily accessible beneath removable floor panels, and even built-in ceiling lights can be moved a foot in any direction and plugged in again.

Suppose it's chilly or too warm. Any of Sherry's co-workers with outer offices can dial a 12-degree temperature change in the revolutionary heating and air-conditioning system, adjustable at more than 4000 individual stations. Fresh air, gathered in massive equipment occupying the entire 6th, 16th and 28th floors, is blown through the building, passing over local coils before emerging in any office. In cold weather the coils contain hot water. In summer they contain cold water.

Interpreting instantaneously, while someone is actually talking, requires unique talents. Sherry must translate one sentence while listening to the next. "When we started," he says, "everyone said it was impossible. Actually we don't translate—we paraphrase, summarize and transpose thoughts and ideas from one language to another. To do it we must be experts in the field that is being covered by the speaker or we'd be lost."

That's why Sherry is getting his doctor's degree in international politics. And it's why, before his 10 o'clock conference date, he'll want to bone up on Vishinsky's subject material for the day. A call to the library building starts things rolling. The books he asks for are loaded in a metal container which is stuffed into a whopping 6-by-12-inch pneumatic tube. Traveling at 30 feet per second, it zips underground to



View up inner shell of General Assembly shows interpreter leaning out of booth under starlike spotlights

the Secretariat basement where an attendant removes the material. If Sherry were in the General Assembly, the attendant could send the smaller papers scuttling directly over there through a smaller four-inch tube system. Since it's just going upstairs, he puts books and all into a black plastic box. This goes on an endless chain belt, moving to the top of the Secretariat and back at 100 feet a minute. On a big panel the attendant sets a control that will

When conferences are held in halls outside UN, delegates use tiny radio receivers to hear translations



automatically kick the box off at the 17th floor, where Sherry or a messenger will be waiting to pick it up. Within minutes of the time he called the library, Sherry's material is at hand.

It doesn't matter which conference chamber is scheduled for the day's work. Whether it's in the startling Economic and Security Council, where open ducts and conduits are worked into the modern ceiling design, or the vast General Assembly hall, the interpreter will go to a soundproof booth behind the double rows of windows that slice the walls of each auditorium. Five of these booths are set aside for interpreters who will convert the floor discussions into the UN's five official languages (French, Spanish, Russian, English, Chinese).

Sherry, who will put Vishinsky's words into English as fast as they're spoken, seldom has any advance idea of what will be said. But he knows it will be fast, violent, and full of quotes from obscure Russian classics. There will be plenty of room for "bloopers"—like the famous incident when Gromyko's loud argument for "reduction of armaments" came out "reduction of arguments." Hence, Sherry will pick his way carefully. Once the translation has left his mouth, the damage may be done because every word he utters is processed instantly through the fantastic simultaneous-interpretation system.

Here's how it works: At the same time Sherry is translating the talk—piped right from Vishinsky's mike to the interpreter's headphones—other translators in adjoining booths are turning the speech into the other official languages. All these translations, along with the floor speech, are piped through a master console, where the sound engineer can send up to five conversations through banks of amplifiers. Out goes the speech in different languages. At any seat in the auditorium, the occupant simply turns a tiny six-position switch and taps into any one of the six channels. Thus he will hear the Vishinsky speech in any of the languages he chooses. The translator he hears will seldom be more than a few seconds behind the speaker. Visitors' chairs are equipped with standard headsets. Delegates at the conference table listen over miniature earpieces like those used in hearing aids. Their selector switches are set in sloping panels that form the table edge.

Translations from every hall where meetings are in progress also are piped over to the executive and press offices in the Secretariat. There, receiving sets on the desks look like standard public-address system "squawk" boxes—with one exception. Beside the loudspeaker there's a dial. By dialing different combinations the man at the

(Continued to page 258)

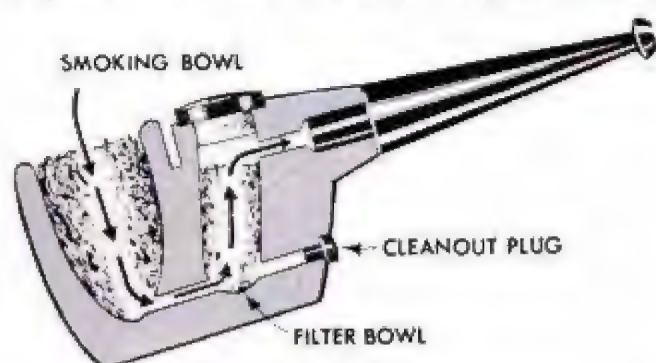


Curved-Wing Appearance of Plane Surprises Photographers

Engineers explain the unusual curved-wing effect noted in photographs of the XB-52's first flight as due to the angle from which they were taken, atmospheric

conditions and normal wing-tip flexing upward under certain conditions. The eight-engine Boeing jet has a 185-foot wingspan and is 153 feet long.

Pipe With Two Bowls Filters and Cools Smoke



Two bowls instead of one distinguish a pipe which uses the rear bowl for a filter. Smoke from the main bowl passes into a cooling chamber and then exits up through the unlit filtering tobacco and into the stem of the pipe. Result is said to be a cooler, cleaner, drier and richer smoke. The divider between the two sections is quickly removed for easy cleaning. The smoke, it is claimed, picks up the taste of the filtering tobacco in the rear bowl.

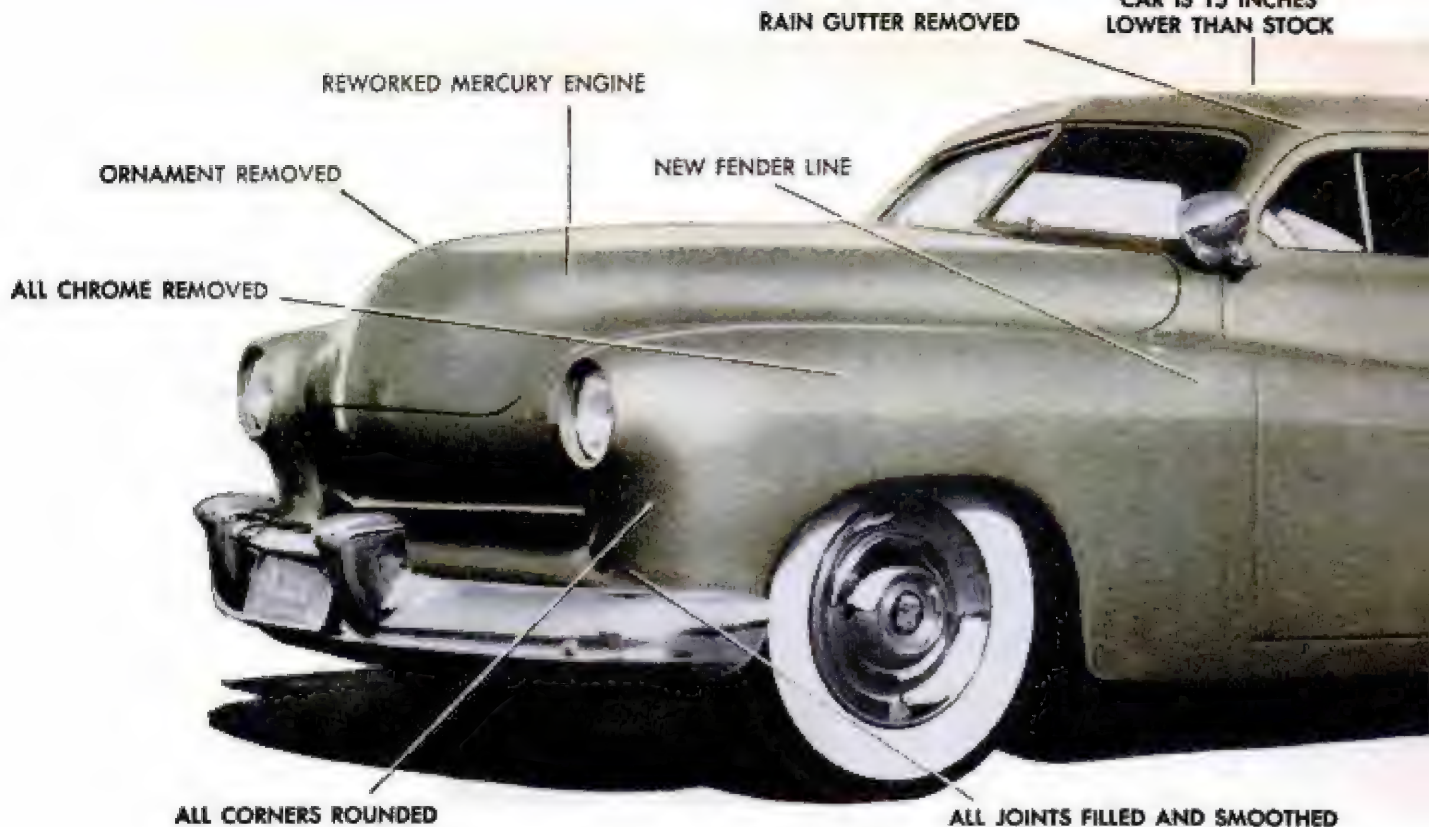
Armor Plate Protects Rail Crews From Attacks

In the wild desert country of southern Tunisia, rebel bands have become so dangerous that the Sfaz-Gafsa Railroad Company has taken drastic means to protect its crews. All trainmen have been equipped with automatic rifles, and trains have been armor-plated. Heavy steel plating covers the locomotive cab, leaving only enough of the window exposed for safe vision.

Bang!

With a noise like a thunderclap, Neville Duke explodes through the sound barrier. Duke, a British test pilot, is something of a hero to his countrymen, for he will crash through the barrier on request—sometimes several times a day—to produce the spectacular and still unexplained bang. His job is to check aircraft as they pass through the barrier into the little-known world of supersonics. On deck for next month is "He Goes Banging Through Sound," a tale of Duke's dangerous work





Turn a custom-car fan loose on a factory-built automobile and you'll never recognize the original. To him, a stock car is just . . .

FOUR WHEELS WAITING

A WESTERN motor enthusiast is planning a tear-drop coupe that will be powered with a gas-turbine engine and steered with an aircraft-type control stick that also serves as the throttle and brake. Push the stick forward to accelerate, pull it back to apply the vacuum-boosted brakes. Left-or-right motions of the stick

will operate the power-steering mechanism.

The car will have a transparent plastic top with polarized shade control and, quite possibly, a fluorescent-paint job that glows in the dark.

Not many people want anything that extreme and yet more and more drivers are restyling their cars to remove the original,

This sports car was built from Ford and Willys parts. Body solder was used lavishly to smooth out lines

Road and Track photo





Few would recognize car across top of these pages as a customized 1949 Mercury coupe. Detail above shows plastic tail-stop-light panel set into body

By Thomas E. Stimson, Jr.

FOR A FACE LIFTING

strictly "stock" appearance. In Los Angeles, for a long time an automotive style center, there are thousands of low, sleek cars on the streets that resemble no known makes. These customized cars started out as Fords, Mercurys, Chevrolets and other standard makes; now each is completely different. In most cases roadability is im-

proved, except in some instances where the owners have lowered their cars to the point where they barely clear the ground.

One owner may spend thousands of dollars in altering the looks of his car, another may farm out the basic alterations and do most of the rest of the work himself. George and Sam Barris of Lynwood, Gil Ayala of

These cars were twin '41 Fords. Owner of one at left spent \$5000 remaking car into low "drive in" type





Wally Welch of Burbank, Calif., points out a few of the changes made in customizing his 1950 Mercury coupe

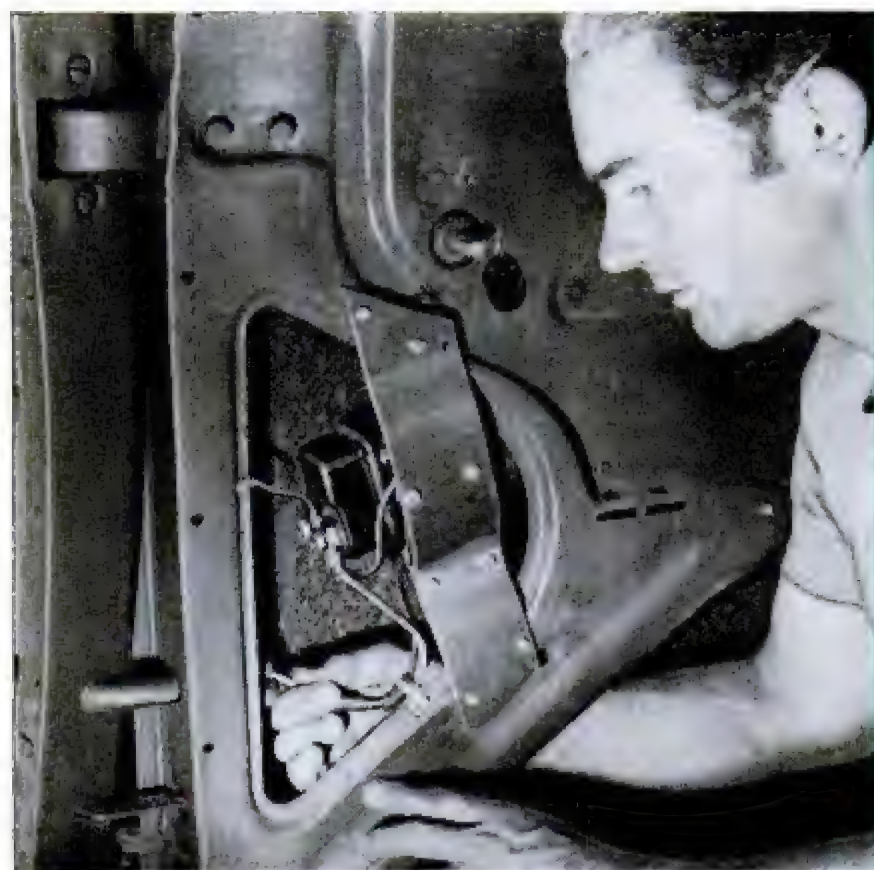
Los Angeles, the Valley Custom Shop of Burbank and a dozen others in the Los Angeles area are so busy they are scheduling work for weeks and months in advance. Cars with license plates from half a dozen different states sometimes can be found at one of the shops waiting their turn for restyling.

A number of years ago, an owner who wanted to change the looks of his car usually replaced his fenders with fenders from other makes and converted a radiator grille from another car. Often these hybrid automobiles had an attractive appearance

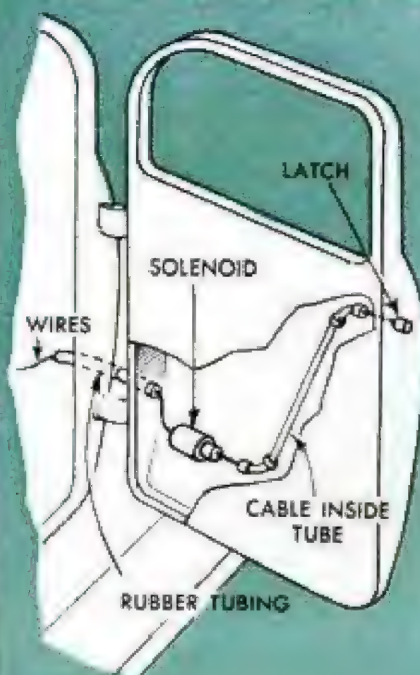
but the new school of custom-car owners isn't satisfied with such makeshifts.

Today a driver wants something brand new. He likes front fenders that are pulled forward so that the headlights are almost over the bumpers. He likes a shallow top above an ordinary body, or a shallow body with a top of original height, or he wants the heights of both body and top cut down. He cuts sheet metal away from the original body or adds metal to it to get the shape he wants.

A custom-car fan wants no hood ornament, a minimum of chrome outside, re-

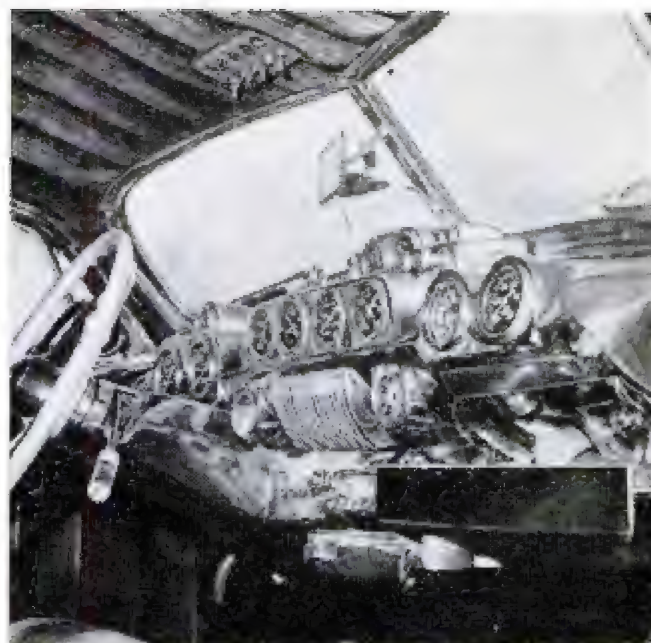


Electric door opener eliminates handles on outside of car





Ignition-type lock for door with handle removed is concealed in chrome strip; it operates electrically



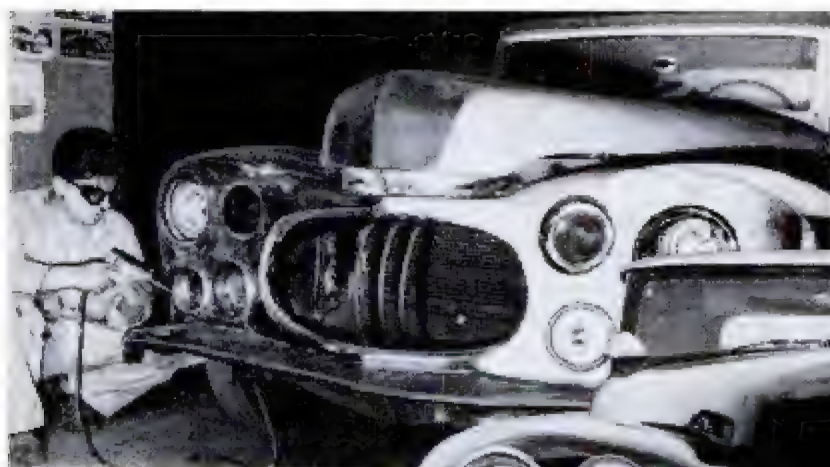
Instrument panel of customized '41 Chevrolet coupe contains 15 dials, 32 push buttons; they all work

styled bumpers, and something unusual for a radiator grille. Sometimes an owner has three separate grilles made up for him, each of a different design, and "wears" a new one when he tires of the old. The quick-change grilles fasten in place with spring-mounted screws that prevent rattles and squeaks.

A few years ago it was stylish to cut a hole in the rear deck lid and mount the license plate inside, behind glass. Today the rear license plate ordinarily goes on the rear bumper. New shapes of plastic taillights go on the rear bumper guards or are faired into the rear corners of the

body, either in the fenders or rear deck.

As one example of a good-looking custom car, though a bit extreme, consider the 1949 Ford coupe owned by Alan Anderson which is being converted into a "futuramic coupe de ville" by George and Sam Barris. The entire body was lowered five inches in front, eight inches in the rear. From the window line up, the top was rebuilt by reducing its height by 3½ inches, sloping the windshield back an extra inch. The central door and body posts were cut away to provide open sides for the car. Framed window glass is being installed in two pieces on each side.



Left, mechanic at work making front-end changes shown in completed job below. Changes include grille, holes for air horns and the various lamps





Rear fenders on this car were extended farther back to permit mounting spare tire on outside by means of panels that were inserted in the fenders. A "continental" spare is a favorite with custom fans



Above, attaching custom grille of "floating" type in front of radiator. Split two-piece bumper will complete the assembly. Below, in building one-piece body, construction joints are first welded together and then smoothed over with plenty of body solder



Barris is extending the front fenders forward so the headlight will be six inches ahead of their stock position. The rear fenders are being extended back an extra eight inches and will be fitted with special taillights. The front of the car is to have a scooped, oval grille shell with "floating" grille bars and independent front bumpers. Doors and deck will be push-button operated. Cadillac wheel disks have been installed. Rear fender shields consist of '51 Mercury shields cut and fitted.

Another restyling example is a '50 Mercury owned by Wally Welch of Burbank. The top of his car was chopped three inches in front, seven inches in the rear, and the body itself was lowered four and a half inches in front, eight inches in the rear. Headlights were moved forward five inches by reshaping the fenders. A new design of grille was created by installing chrome "teeth" from a '51 DeSoto grille, turned to a different angle.

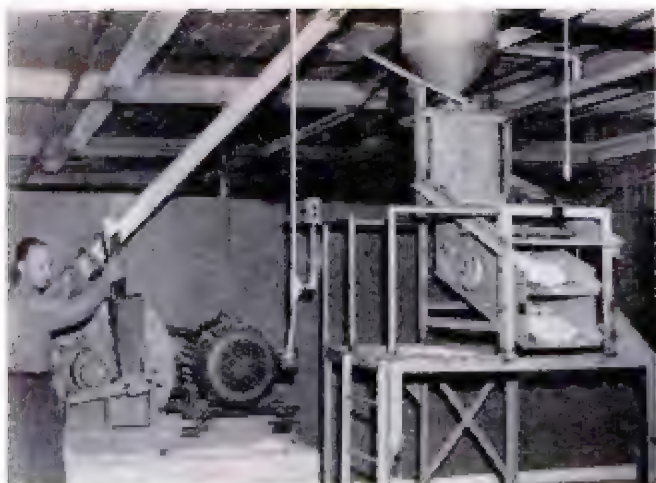
Part of the customizing details of another Mercury, owned by Louis Betancourt, include filling all construction joints to provide a one-piece body, lowering the car 15 inches by chopping the top and channeling the body, and installing a Mercury engine rebuilt to 300-cubic-inch displacement, a companion engine to one that set a record in its class of 175 miles per hour at last year's Bonneville speed trials.

Betancourt's car is painted a scintillating green gold outside, crystal green within. Steering column and dash accessories are chromed. At present, Betancourt is preparing to customize the upholstery and plans to install a curved rear seat and a front seat that slides forward on rails and converts into a bed.

(Continued to page 284)

Exterior built up by welded strips and solder must be filed to satin smoothness before spray painting

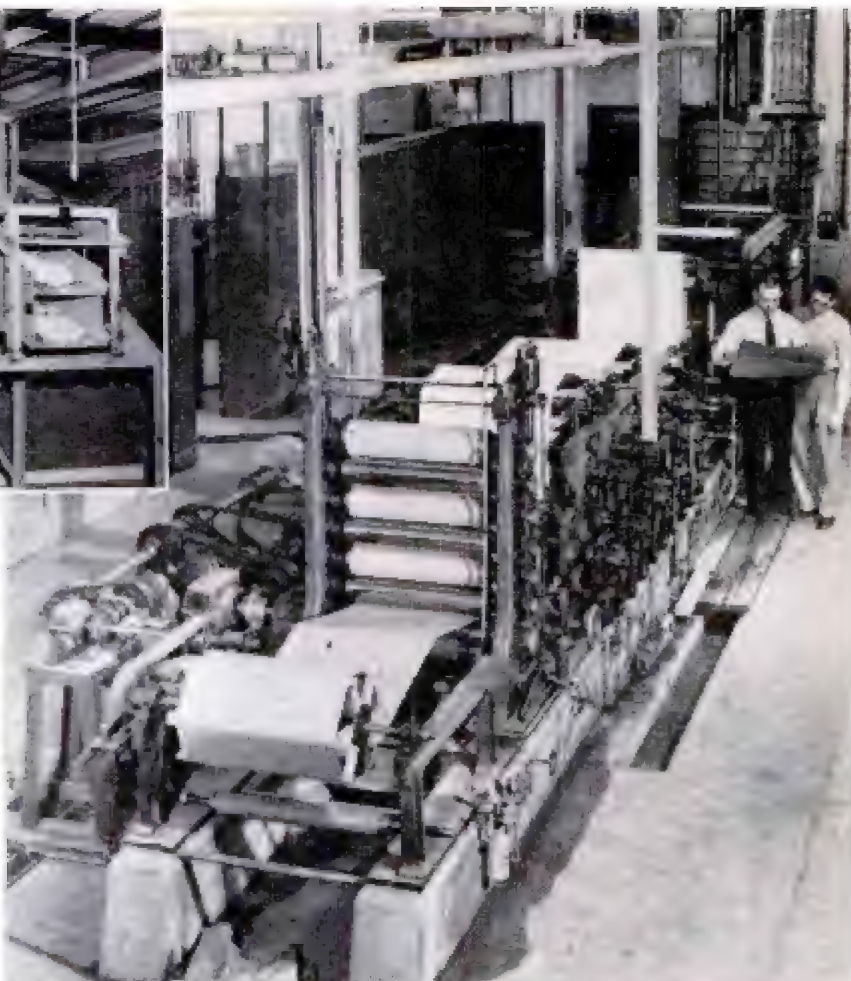




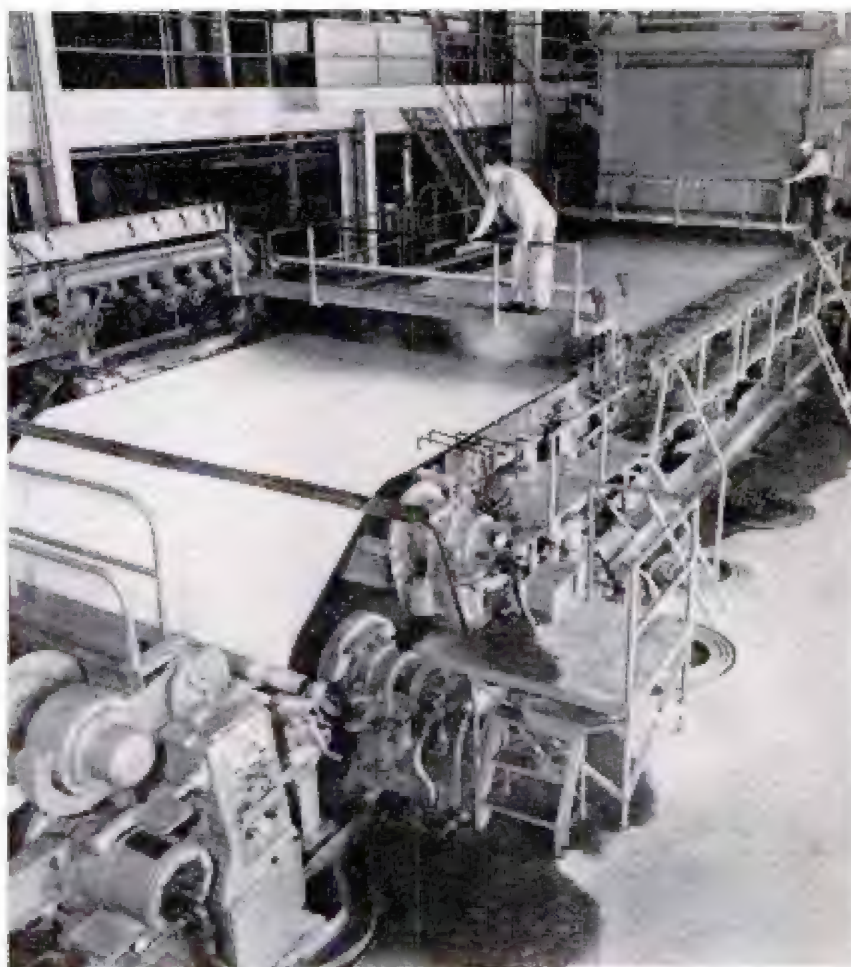
Worker feeds miniature logs into pint-size chipper to start process

Paper Mill— Sample Size

DIGNIFIED RESEARCH scientists chuckle like kids over a new toy when they operate a new paper mill near Camas, Wash., for the mill is a miniature—a little test plant that turns out a variety of paper products. Built by Crown Zellerbach Corporation near the site of its huge paper plant, the miniature mill is complete from a tiny log chipper to a pint-size paper coater. It's the heart of a \$500,000 research laboratory and performs all the functions of a real mill. The little chipper receives fireplace-size logs and reduces them to small chips for pulping. Later in the process a miniature press screens and rolls the fibers into paper in the same manner as its 420-foot prototype. The mill isn't operated as a toy—it contains all types of special equipment for testing new papermaking methods, and has been used to turn out paper from such materials as wheat straw and cotton stalks. Previously, any experimenting meant shutting down a commercial mill for a trial run. With the model mill, the research and production men also can discover "bugs" in a tricky process without involving a commercial mill.

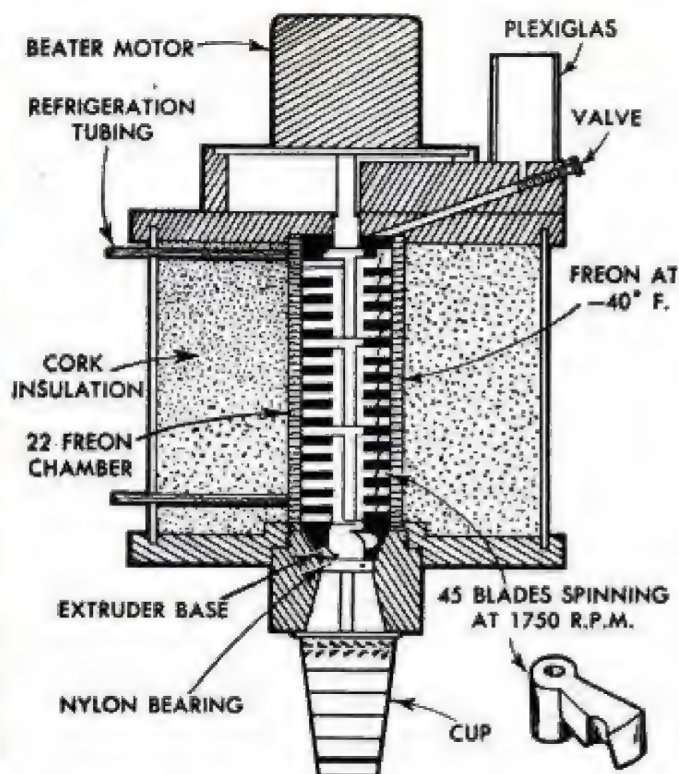


Miniature mill performs every operation of a commercial mill and can also be altered for experimental work. Above is the paper-making machine which turns out little 26-inch rolls. Below is a section of the prototype which produces huge rolls 15 feet wide





Quick-freezing feature permits customer to choose favorite flavor mix which is pumped from fountain



Rapidly spinning beater "atomizes" milk, alternately dashes it against frigid sides and scrapes it free

Flash Freezer Supplies Milk Shake in Eight Seconds

Rich-tasting frozen milk shake is produced in eight seconds by a new flash freezer. Flavored mix fed from a reservoir at the top of the device falls through a narrow freezing cylinder. As it falls, it is alternately thrown against the sides of the

container and scraped free by a whirling beater until it finally collects at the bottom and is forced into the serving cup. The self-contained, easy-to-operate freezer permits each customer to choose his own flavor mix.

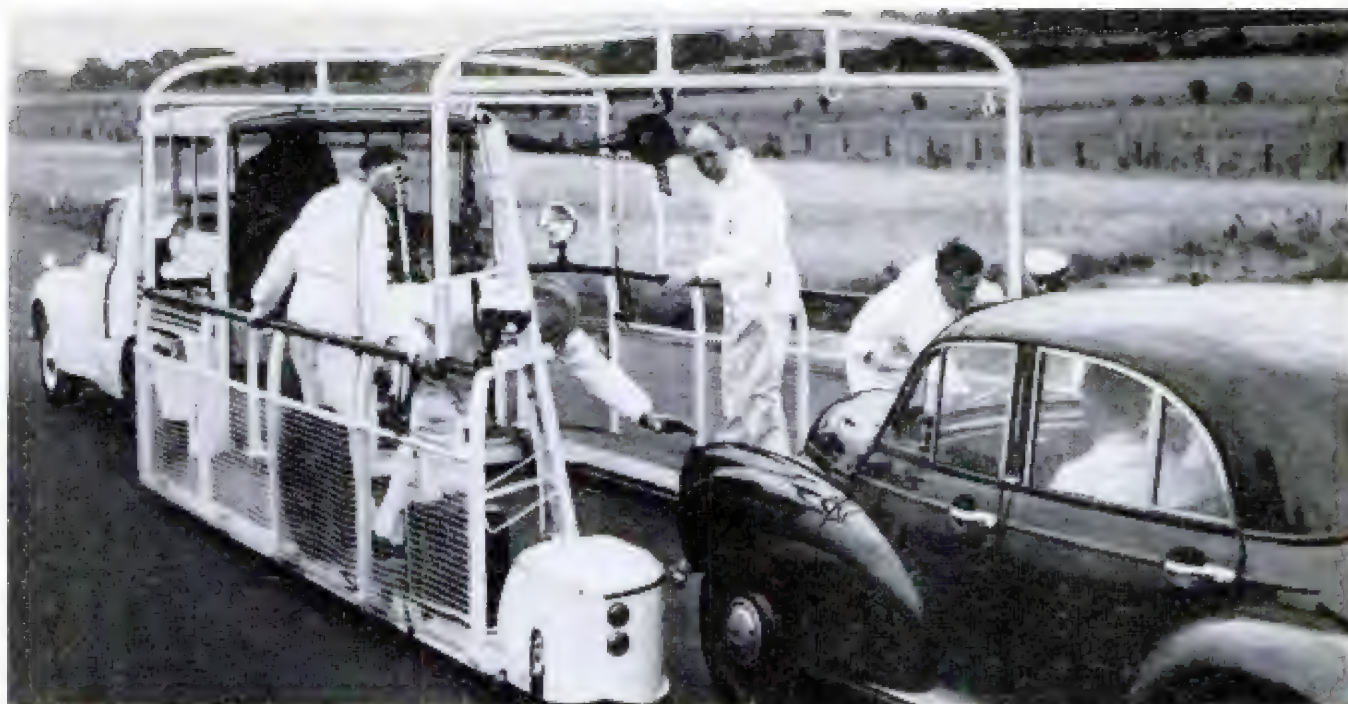


Ironworker's Suit Wards Off Heat

Men who work with molten iron are fully protected from the heat by a strange costume designed in Austria. The outfit consists of boots, a long apron, big mittens, goggles and a cape with a loose hood. Atop the hood is a broad-brimmed "hat" which prevents droplets of molten iron from reaching the worker's neck. The new founder's outfit was recently displayed at the Austrian Museum of Technology.

They Call It Spin Fishing

That's the title of a big full-color feature coming up in May, describing a new angling technique that's sweeping the country. Experts say we'll soon be a nation of spin fishermen. Spinning is so versatile you can use flies, plugs, surf-casting lures, live bait or your own recipe for doughballs. You can send your lures a good many yards farther than you can with ordinary fishing gear; you can do it even when you're hemmed in by bushes and trees; and you can be an expert with little practice. Best of all, you just can't backlash a spin-fishing reel. Don't miss the May article by outdoor writer Joe Godfrey, Jr., on this major new sport



Time for maintenance and the Minor is eased into the tender. All work was done at about 20 miles per hour

10,000 Miles Nonstop At 36 Miles Per Gallon

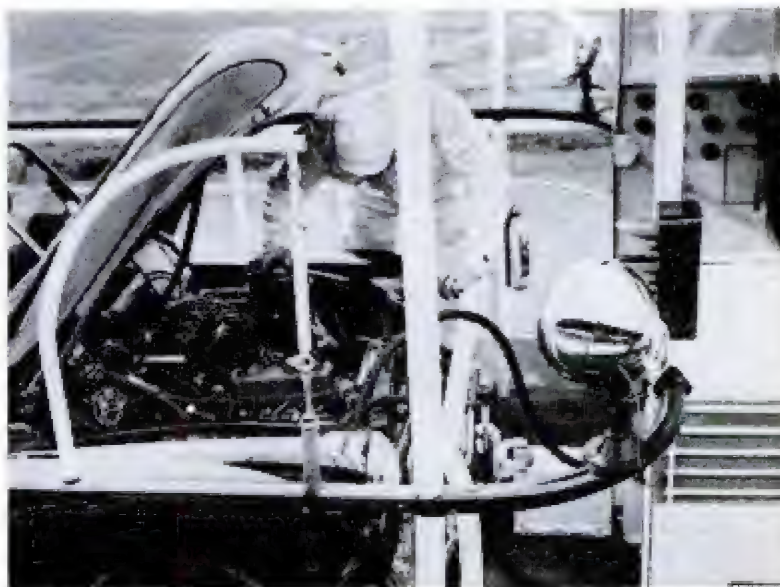
FOR NINE DAYS and nights a Morris Minor sedan rolled around a British race track without a stop. In those nine days, the car, tiny by American standards, went 10,148 miles, averaging 45.3 miles per hour and 36 miles per gallon (43 miles per Imperial gallon used in England). The Minor was driven into a U-shaped trailer for servicing. To guarantee that the car was always under its own power, a meter at the front of the trailer measured its forward thrust. At no time was the Minor towed.

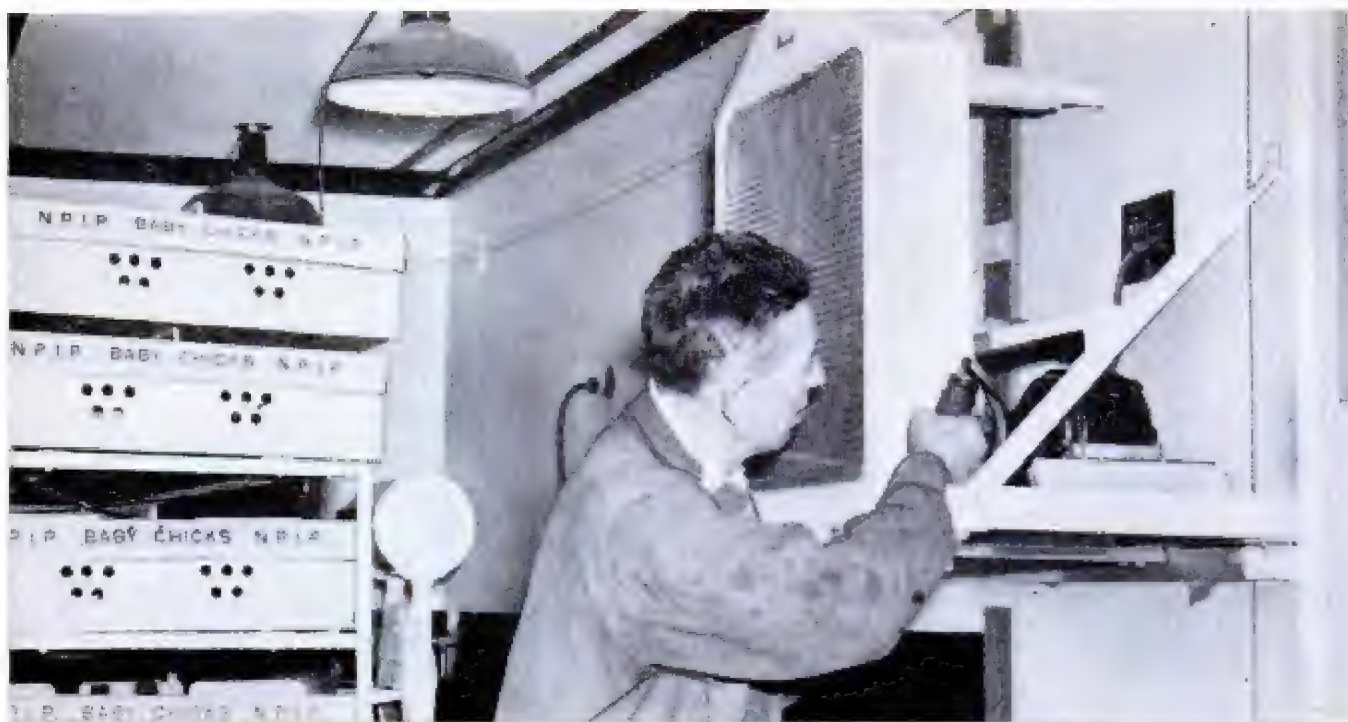
To change a rear tire, wheel was braked and raised. Other wheel kept driving car



Refueling in motion. A positive thrust against the trailer of at least 10 pounds was maintained by the car during servicing

Oil changes were made by pumping in new oil as old oil was drawn out. Directly ahead of car is device that measures thrust





No heat in the hatchery, so this farmer piped hot water through an old Pierce-Arrow radiator to make heater

Recipe for the Farm Mechanic: TAKE A JALOPY --

By William Gilman

Home on the turkey range to the hired man is an apartment built atop an old truck chassis. He lives here while guarding the flock



YOU'LL FIND them all over the United States. Just about every rural township has one. His neighbors call him "quite an inventor," or kid him about his contraptions. He's the fellow who is always rigging up some kind of machine to save work around the farm.

To build a mechanical hired man he'll use old parts and just plain junk. Since a jalopy car is a good source of such things, it's his favorite stockpile of "strategic materials." In fact, one way you can recognize his place is by spotting an old car lying like an awkward beetle in the yard. Before it's dragged away and dumped into a gully, it's picked pretty clean.

Henry Ford would be a little amazed at all the uses found for his Model-A transmission. In a mechanically smart farmer's hands it becomes a just-about-perfect gearbox for governing the speed of the freight elevator, feed conveyor and manure cleaner that have banished pitchfork, shovel and backache from mechanized farms.

Actually, the American farmer usually drives a modern car, but values the parts in his old wreck for one of several reasons. His homemade machinery not only is cheaper than manufactured equipment but does exactly what his own needs require. Besides, he likes to tinker.

Whether he's in Maine or California, he has the pioneer Yankee spirit of Eli Whitney and John Deere. And close at hand he has a supply of junk—like the broken buzz saw from which Deere made the first steel plow—a plow that made modern farming possible.

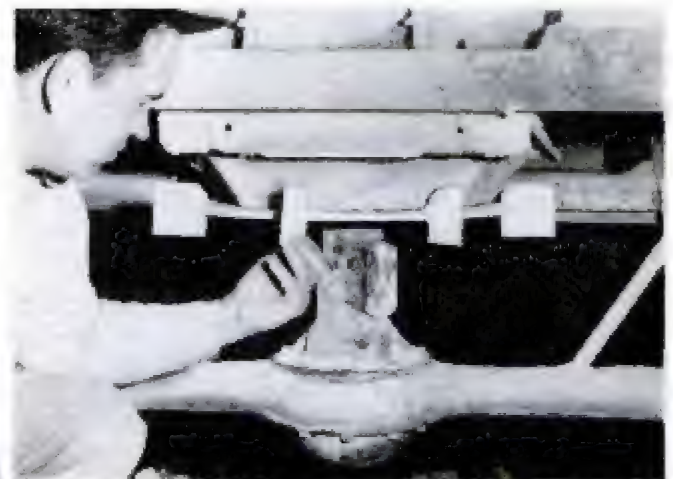
A champion gadgeteer among poultry farmers is Charles Nassivera, of Glens Falls, N. Y. His automatic egg cooler has been copied by many other chicken farmers. And his patented "dunker" is a contraption de luxe. It lowers a killed hen into 128-degree water, keeps her there 30 seconds, raises her to drain—and she's ready for the next step on Nassivera's conveyor line, the mechanical feather picker. The dunker was built from miscellaneous junk including a washing machine, hydraulic doorstop, heater and lawn mower.

Like others, Nassivera had done his share of picking old cars apart. For example, when he built his hen house he in-

stalled a stairway to the upper floors, but has never used it because he immediately rebelled against walking up with bags of grain and down with baskets of eggs.

The rear end of an old Willys solved things nicely. It's mounted under the roof of the four-story house. Around its drums wind the ½-inch steel cables that run the homemade elevator powered by a three-horsepower electric motor. The differential keeps the pull equal on both cables.

There are safety features too. The hoist is belt-driven from the gear-reduced motor. If the elevator goes too high, the belt starts slipping. To guard against a broken cable, Nassivera installed a sharpened steel dog at the bottom of each side of the elevator timbers. The cable compresses a spring which governs the dog. If a cable broke, the dog would dig into the elevator framework and keep it from falling. To make



Enterprising farmer dumps bag of lime into the hopper of his homemade spreader—a tractor-drawn trailer. Inset at right shows spreading fins welded to a steel plate beneath hopper. Differential spins the fins



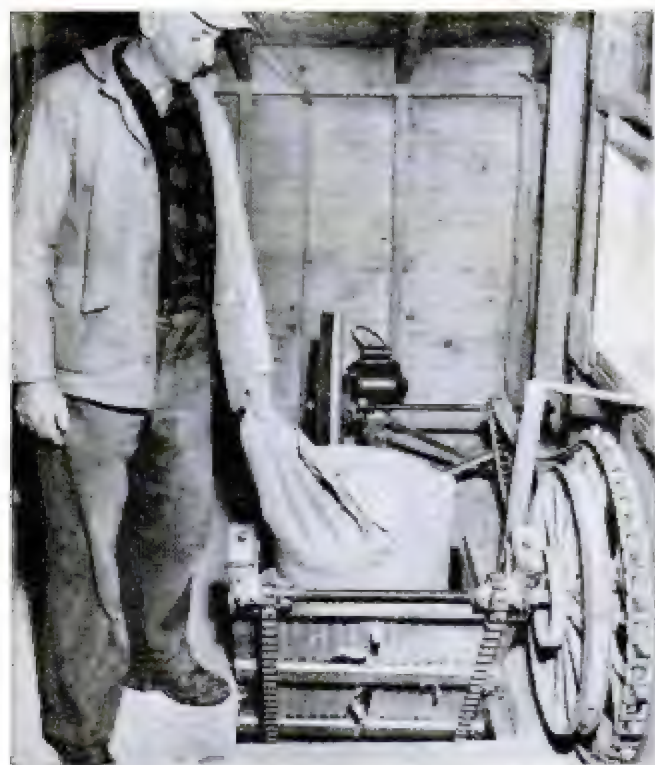


Old dump truck now serves as self-propelled elevator for baled hay. Down goes truck bed, up comes elevator

sure, Nassivera experimentally "dropped" the elevator by loosening a connection. The elevator dropped three inches and the dogs dug in so deep it took the inventor two hours to free them.

Two other jalopy parts solved another problem. Nassivera's incubator room was kept warm by a hot-water boiler, but the room where he dressed fowl for market was too chilly. He didn't want to waste space on a separate stove, so rigged up a heat circulator mounted on the wall. It's the radiator from an old Pierce-Arrow. Hot water is piped to it from the boiler. An old Chevrolet contributed the motor-driven water pump and fan.

Small motor working through an ingenious gear-reduction system brings bags of feed up to second floor



New England, of course, is the traditional mother of invention and it's here that jalopies don't die — they just fade away. For example, if there's any life left in the old motor, the car is used as a power plant. Sometimes, it's a "doodlebug" to do the work of a small tractor. Or, by jacking up the rear end and attaching a belt, the farmer has something to run his saw or feed grinder.

When the motor is too far gone, the serious stripping starts. Even the farmer who isn't a mechanical genius can always find a use for car wheels. John Pratt, Clarendon, Vt., mounted a pair of wheels side by side over the feeding apron of his ensilage

Two Ford transmissions make speed just right in barn cleaner that carries out manure, dumps it in spreader





Farm trailer built from the front end of an old truck now totes up to 38 boxes of apples from the orchard or 1½ tons of hay from the meadow. Inventive farmer built the platforms low to minimize necessary lifting

cutter. They act as rollers that press down the incoming green hay and keep it from clogging the opening.

There's always use for the trailer that can be built easily out of a car's front or rear end. Some are simple affairs for transporting grain, milk or young stock. Some are built low and large for hauling hay from the meadow or boxes of apples from the orchard.

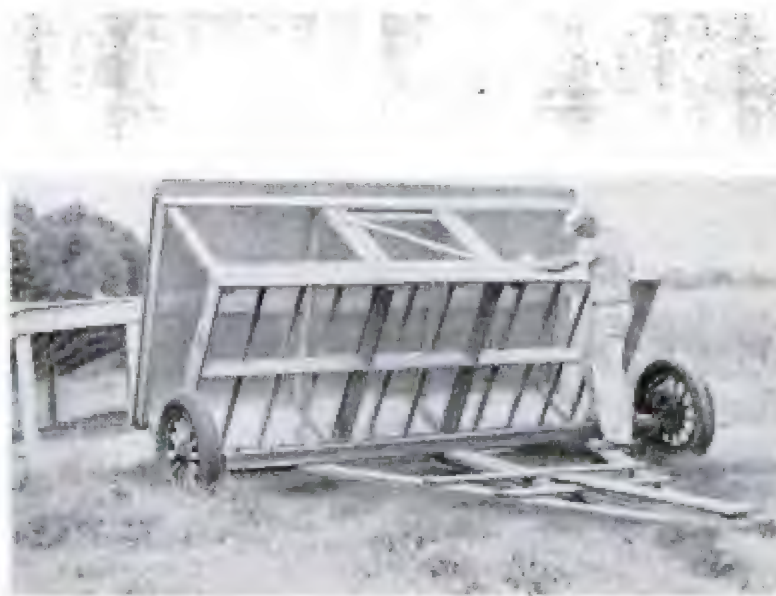
Or take the special trailer built by poultryman Cecil Chadbourne for moving an awkward range shelter. His trailer, pulled by a tractor, was made by cutting an old car's front axle in two and inserting a four by six-inch timber that widened the wheel span to 12 feet. Scrap lumber completed the frame onto which Chadbourne tips the range shelter.

Others use all four wheels to make a heavy-duty wagon. The trailers built by Alfred Pierce, Claremont, N. H., are good examples. A tractor runs them from field chopper to silo. Mounted below the trailer's rear gate is a drum around which a canvas winds as it "self unloads" the chopped hay or corn. It's run by a portable motor.

Robert Goodell, Putney, Vt., saw no reason why he couldn't use his old truck both to haul chopped feed and self-unload it. This way, he can unload anywhere—no need to be near an electric outlet for operating the unloader motor.



Old truck's motor turns roller to move a canvas belt on bed of vehicle. Belt slowly unloads field-chopped hay. Below, the axle of an old Buick, cut in two and lengthened with a timber, becomes tractor-drawn trailer for moving bulky range shelters



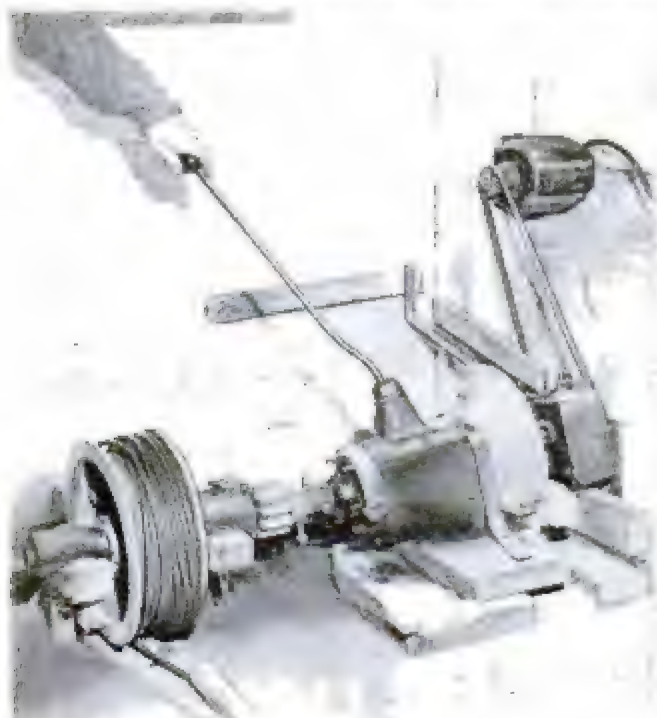


Hand pressure "throws in" clutch on electric hoist which lifts milk cans. Wall pivot is Nash drive shaft

Goodell added a power takeoff to the jalopy truck. It operates a pair of pulleys at the rear. They, in turn, transmit power through the gearbox of an old car, and from this homemade gear reducer the power runs the main bull gearing from an old tractor's rear end—which runs the winding drum.

Suppose an old truck has lost its motor. Turkey farmer Arthur Goodnow, Brandon, Vt., converted one into an apartment which keeps the hired man home on the

Washing-machine gearbox and Model-A Ford transmission provide gears for belt which removes manure



Freight elevator in a three-story hen house still has "feel" of the old Pontiac which supplied parts

range while guarding Thanksgiving birds against real foxes and two-legged ones.

When the flock is moved to a new pasture the truck is towed there by tractor. The main room is furnished with a stove, lamp and table. A room built over the cab contains a cot, spotlight and choice of weapons—either single or double-barreled shotguns.

Another Vermont Yankee, James Leach, Jr., got hold of a 16-year-old dump truck that could still run well enough for what he had in mind—a self-propelled elevator for baled hay. He mounted his homemade conveyor over the dump body and cab so that it rides flat as Leach moves from one farm and barn to another. The rig saves all the work of moving a separate elevator around. When the dump goes down, the conveyor goes up to a window.

Many uses can be dreamed up for the transmission from a jalopy. It's a made-to-order gadget for gear-reducing the power of an electric motor. For example, dairyman Ball Lyons, Bennington, Vt., rigged up a gutter cleaner that automatically takes manure out of his cowbarn in three minutes. The manure gathers on top of a movable belt in the gutter. It's run out of the barn and up a ramp where it empties into the waiting spreader.

This outgoing trip is powered by a one-horsepower electric motor that runs through a V-pulley which, in turn, connects to a jalopy mowing machine parked outside. The mower was simply Lyons'

(Continued to page 288)



Technician watches windows, controls operations in plant with hand switches. Below, units slip out for repair

Single Control Panel Operates Oil Refinery

Engineers now are able to supervise and control an entire manufacturing plant through a single control panel. Modern oil-cracking plants all over the world have such central control rooms. One example is in England, where one man seated at a panel can control all refining operations. Windows built into the panel tell him the pressures, temperatures, rates of flow, liquid levels and other factors in the refinery. Within reach are electronic controllers to operate valves throughout the plant. Each controller is a unit which can be slipped from the back of the panel for repair. Electrical impulses from the controllers are converted to pneumatic impulses to operate the valves. Thus the supervising engineer has full and instant control over every step of the process.

☞ Coffee accounts for 40 percent of our imports from Latin America, according to a recent report in the *Chemical and Engineering News*.



Lightweight Ocean-Crossing Cable Is Insulated With Plastic

Easier to handle and less expensive to lay than the present steel-jacketed cable that links continents, a plastic-insulated ocean cable is undergoing tests off the coast of Long Island. The cable uses a 10-strand cadmium-bronze wire that has been insulated with polyethylene plastic. New techniques of paying out the cable had to be

developed as well as new splicing methods. Once a cable comes to rest on the ocean floor, it is subjected to very little wear because it lies in soft ocean silt. The heavy protective jacket is necessary only when the cable is being lowered or raised. The new paying-out techniques have eliminated the need for this heavy protection.



"Four Year" Ship Model Driven by Steam Engine

Powered by a home-designed steam engine, a model of the *Empress of Britain* cruises across a pond in Kensington Gardens, London, each Sunday morning. The seven-foot model is the work of Alfred Kidd, a London bus driver, who spent an average of three hours per day for four years in designing and building it. The craft's double-acting steam engine drives twin propellers. Weighing 93 pounds, the model is transported to and from the water on a "dock on wheels" which is pushed into the water to float the liner. Despite the accu-



racy and detail of the model, Kidd figures the necessary parts cost him only \$24.



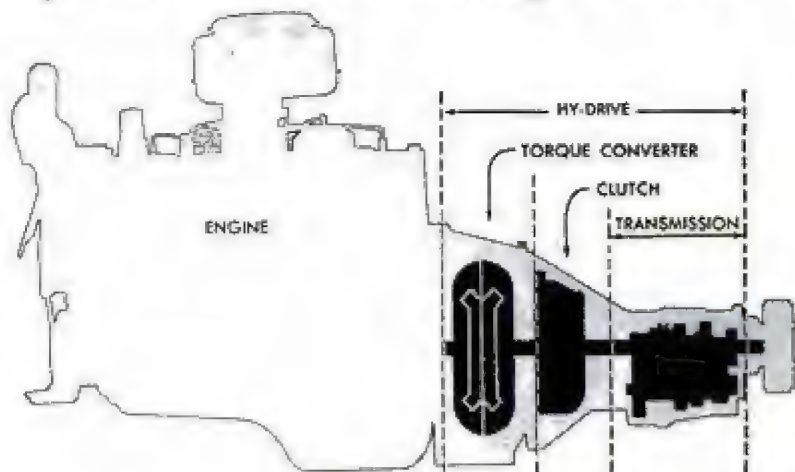
Ground Walnut Shells Are Used to Clean Aluminum Tire Molds

Finely ground shells of English walnuts effectively clean aluminum molds used in tire manufacture at Firestone. The shells are less abrasive than sand and less likely to pit the molds. They are blasted against the mold by compressed air. Once the mold is clean, the shells are drawn out by vacuum through a tube. The company purchases 125,000 pounds of ground shells a year for cleaning molds.

¶ In a single wing of a modern jet bomber there are nearly 6000 bolt holes which must be accurate within one to two thousandths of an inch, or less than the thickness of a human hair.

Hy-Drive Transmission for Plymouth Reduces Shifting of Gears

Shifting of gears is reduced to a minimum with Plymouth's near-automatic Hy-Drive transmission just announced, which operates in conjunction with the standard three-speed transmission. The Hy-Drive transmission is of the torque-converter type similar in design to that used in the Dodge and DeSoto, also developed by Chrysler engineers. The important difference is that Plymouth's Hy-Drive is linked to the conventional transmission and offers the use of the latter in first and second. Although the foot clutch is retained, it need only be used in making the initial shift into high. No further foot action is needed for stopping or starting unless the driver stalls the engine or deliberately wishes to shift into first or second. Hy-Drive starts off smoothly in high. The torque converter



uses the engine oil and is connected with the engine-oil system. A drop in engine-oil pressure does not affect the transmission. Oil capacity, however, has been increased from 5 to 10 quarts. Filters and seasonal changes are recommended. The unit is simple in design, low in price.

Sunglasses Have Small Mirrors to Provide a Backward View



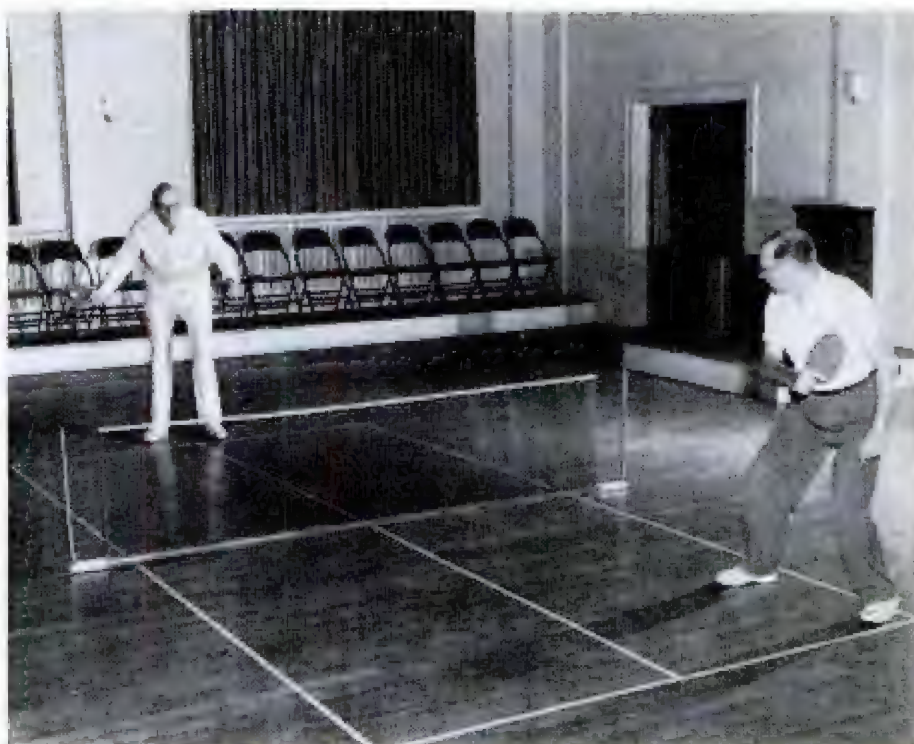
You don't have to turn your head to look behind when you're wearing mirror-equipped sunglasses. Two small mirrors slide into the frame. They can be removed, if desired. The glasses can be used to advantage by cycle deliverymen, hunters, detectives and fishermen, according to the manufacturer.

¶ With the synthesis of morphine, the pain-easing drug of the opium poppy, only strychnine is yet to be synthesized among the alkaloid chemicals found in plants.

Floor Tennis Combines Elements of Two Games

Called floor tennis, a game originated by Dr. H. A. Hattstrom of Glenview, Ill., is a mixture of tennis and table tennis. It is played with a table-tennis ball on an 8 by 16-foot court, with a 24-inch net. The bats are slightly larger than those used in table tennis, and the ball is bounced before being hit by a serving stroke which is made from below the waist.

¶ Setting a world's distance record for a non-stop flight by helicopter, a Bell 47D flew 1234 miles from Fort Worth, Tex. to Niagara Falls, N. Y. on September 17, 1952.





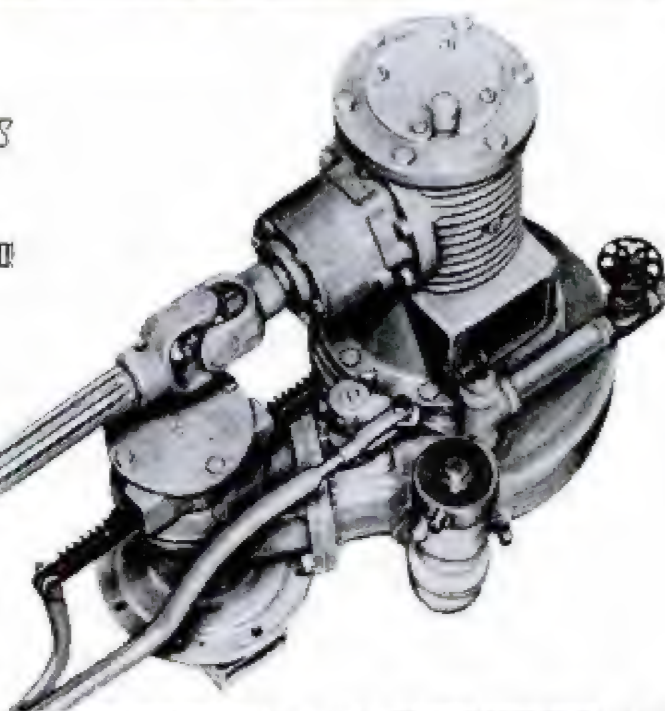
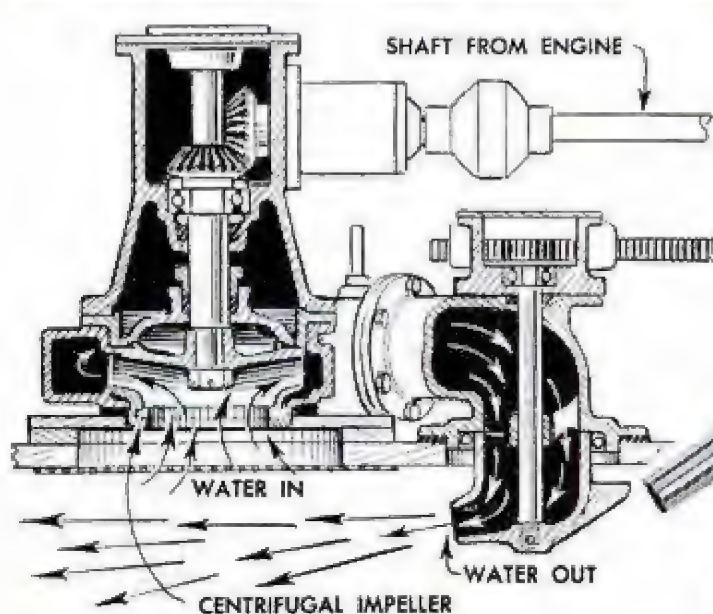
Higher fender lines make the 1953 Nash Rambler look longer and lower. Adding to the sleek appearance are a functional hood scoop and a simple oval grille. The new model was styled by Italian designer Pinin Farina



Left, the 1953 station wagon. Horsepower of Rambler engines has been boosted slightly to 85 on standard models, 90 on Hydra-Matic models. Right, Continental tire mount is standard on convertibles and hardtops

From the side, the Rambler's longer look is apparent. This is the hardtop convertible, the Country Club. Glass area in all models is increased. Windshield has 725 square inches, 140 more than in previous years





Water Jet Propels Boat

WATER SQUIRTED from a nozzle beneath the stern propels a boat fitted with a new water-jet propulsion unit. The water is drawn through a grille in the hull, is put under pressure by a centrifugal pump and emerges from the curved nozzle as a powerful jet stream which pushes a 17-foot runabout along at 20 miles per hour.

Just recently adapted to pleasure-craft use, the water-jet principle has proved successful in tugs, fireboats and armed-forces craft. Some assets claimed for the water-jet propulsion unit are: It eliminates clutch and gearing; eliminates propeller and rudder, since the jet both steers and propels; provides power brakes (will stop a small boat in its own length from full speed); digs itself out of sand banks or beaches where it has run aground; will operate efficiently in a mixture of up to 60 percent solids (mud or sand); gives full power under all loads; provides outstanding maneuverability, more so than rudder-steered craft; is self-cleaning; provides for power bilge emptying and has an adaptation which provides water for fire fighting.

The 61-horsepower engine in the unit



Water is drawn through grille at right and enters propulsion unit, which shoots it out through curved nozzle to provide power. Turning of nozzle steers boat

weighs 400 pounds, and the pump and jet installation totals 101 pounds. The nozzle, which both pushes and steers the boat, extends 3½ inches below the hull bottom, permitting the boat to operate in water as shallow as 11 inches. When in motion, the boat can be driven over logs or other obstacles without damaging the boat or the obstacle. The centrifugal-impeller-type pump is attached to the piston engine by shaftings and will deliver 1000 gallons of water per minute. Fuel consumption is said to be about the same as screw-driven boats. Fishermen using the boat can troll at any speed and can fish safely in marshes.

Shop managers check
antique whaler's lantern.
Below, wooden Indian
holds jumping beans



THIS CURIOSITY SHOP BEATS THE DICKENS

By Rafe Gibbs

DO YOU HAVE a mustache cup for sale . . . left-handed . . . about 1880 vintage?"

The average clerk in the average store would throw up his hands at such a question, but not the clerk in Ye Olde Curiosity Shop on Seattle's Alaskan Way. He began rummaging around, and in 3 minutes and 41 seconds came up with a cup manufactured years ago to prevent dunking of a lip adornment. Left-handed, too.

A customer in the store examining a pair of dueling pistols once owned by a pre-Civil War gentleman of the South, turned to his wife and said:

"If I bought these, I'll bet I could even get my change in Confederate money."

The wife smiled. "That you could. Look, there's some Southern currency over in that corner."

The shop's variety is endless. There are fine oriental and Alaskan carvings, fleas in dresses, shrunken human heads, deadly blowguns, an Eskimo shovel cut from a whale's rib, exquisite silks, totem poles two inches to 30 feet tall, the giant tusk of a prehistoric elephant, an ox yoke which linked the plodding team of pioneer Ezra Meeker and an Eskimo sled with ivory runners.

Perhaps no one knows what all is crammed into the world-famous little shop tucked like a sea gull's nest on

the water's edge beneath Coleman Dock, not even Russell James, owner and operator, whose pleasant smile has welcomed visitors since 1914.

The other day James, probing in a corner of the shop's basement, came upon a heavy wooden box on which was scrawled simply "1907." Being a curiosity-shop operator, he was curious and ripped open the lid. In the box was a fortune in Eskimo handmade articles of leather and ivory—mittens, moccasins, necklaces, head adornments. Some pieces were a century old.

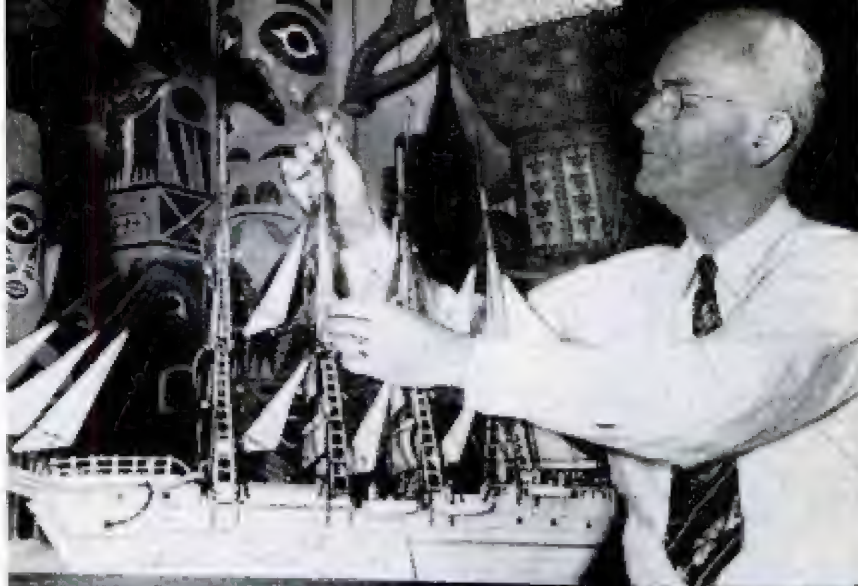
History is all over the place. If you ask James to show you a brass lantern from an old whaling ship, which rests high on a shelf, he'll climb on a wooden box to get it down. Black lettering on one side reads: "Capt. Amundsen North Polar Expedition."

The shop was started 54 years ago by James' late father-in-law, J. E. Standley. When Standley was nine years old in Ohio during the Civil War, his teacher gave him a book for having the neatest desk in the class. The book: "Wonders of Nature."

That started Standley on many a summer's trek along the Ohio River in quest of Indian and other curios. When he later opened a grocery store in Denver he took his curios with him, and collected more. They crowded the groceries, but drew a lot of customers. Then in 1899 he thought it would be more fun to sell curios than groceries. Seattle, still on the raw frontier side, was booming and looked like a good site. He set up Ye Olde Curiosity Shop on the docks that step off to the Orient and Alaska. Sales the first three days totaled only 25 cents, but they have been picking up ever since.

Standley died in 1940 but the shop is still in the family. Russell James, who married Standley's youngest daughter, took over from the founder, and now his son Joe is associated with him.

It's a never-ending source



Just one showcase shows variety of items, from shrunken heads to intricate ship model carved by an Eskimo over period of seven years. ↓ Sailors sell many curios to shop, then buy others before leaving





Big walrus tusks impress a small customer. Want to find some Siwash Indian bread, an ox yoke, Eskimo mittens, a whale's jawbone, oriental carved jade? You'll find these and thousands of other items in the shop

Men packed real shootin' irons in days of these pistols. Weapons range from dueling pistols to blowguns



of wonder to James the oddities some persons want to purchase. There's the matter of the whale jawbones. In 1908 the shop acquired two 21½-foot-long bones, which were placed in the form of an arch at the entrance of the shop and became its trademark. The bones had been found on Cape Race Light of Vancouver Island. Indians built a raft and sailed the bones to Seattle, where each received five dollars for the job.

Some years ago a retired salt merchant of Pittsburgh who had taken a fancy to the huge bones wrote that he would like to buy them. For an entire morning James toyed with the idea of selling the trademark. In the afternoon a Swedish sailor walked into the shop.

"I wonder," he said, "if you would like to buy two fine whale jawbones—even bigger than you got? 22½ feet long, they are."

Somebody, explains James, is forever coming into the shop in the nick of time with something. Recently, however, the shop lost 50 percent of its trademark. A truck backed into one of the bones.

"We can set a price on most anything that is brought to the shop—just as a vegetable dealer can set a price on a basket of lettuce," says James. "But there are some things—keepsakes—on which we do not care to set a price, and discourage their sale to us. The sentiment attached to any object dies in our shop."

Typical of rejections was the item belonging to a neat little woman with tightly knotted gray hair. She carried a shawl-wrapped object into the shop one day. When the shawl was unfolded, there stood gleaming in polished radiance a Russian samovar, hand wrought with the delicate,



Among the shop's rarest treasures are these eleven parading elephants carved from a single piece of ivory

painstaking care of an ancient craftsman.

"My husband was captain of a four-master that sailed 'round the world many times," explained the woman with tears in her eyes. "The samovar was a gift of the Russian royal family. The Cap'n liked his tea, he did, and had the cabin boy serve it to him every day in the samovar. He's been dead 20 years now, and the samovar is all I have to remember him by. But now I need money for the grocer's bill. Will you buy the samovar?"

"Yes," said James, "but not today. You try one more day to raise the money you need some other way. If you fail, come back and I will give you a good price for the samovar—good, but still not adequate to cover the sentiment in that urn for you."

The samovar went back into the shawl, and the owner left. She never returned.

The turnover in curios is surprisingly rapid. Every now and then, however, the shop picks up a slow seller. Fifty years ago it took in some Siwash Indian bread—hard and flat, made of seaweeds, kelp, wild berries and fish eggs. When Seattle had a bakers' strike, James offered in advertisements to come to the relief of breadless Seattlites with the ancient Siwash concoction. There were no takers.

In the not too distant past, Indians used to paddle in 40-foot dugout canoes to the shop from points on Puget Sound as far as 150 miles away. If the tide was in they would barter their wares directly from their

(Continued to page 274)

Almost lost in clutter is a huge beheading sword. Right, seaman sells Joe James an oriental ebony carving





Picker, left, sits on top crossbar as he raises lower section. At right he lowers Pifa nuts to ground by rope

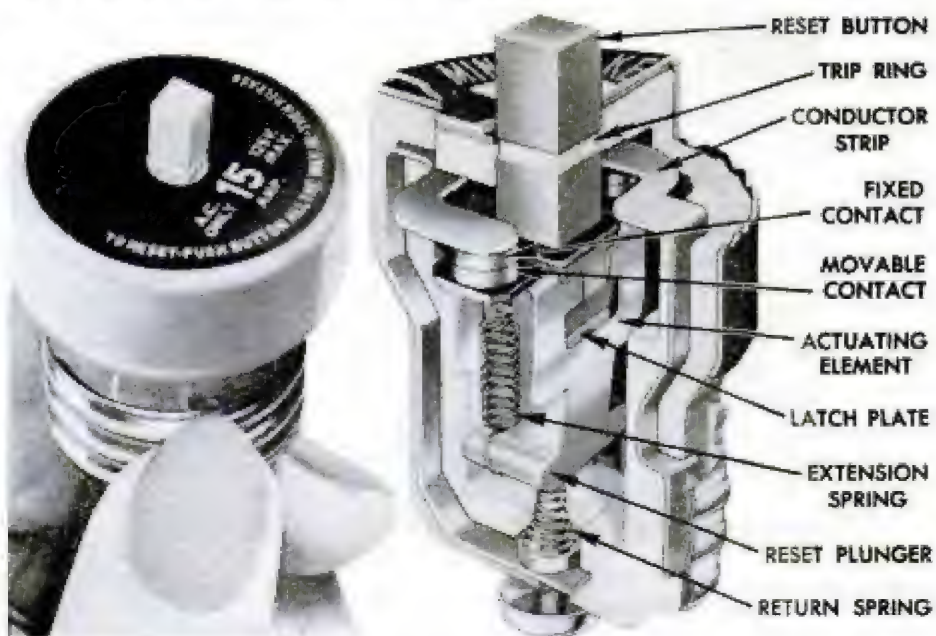
Pifa Picker's Climbing Aid Affords Record Harvest

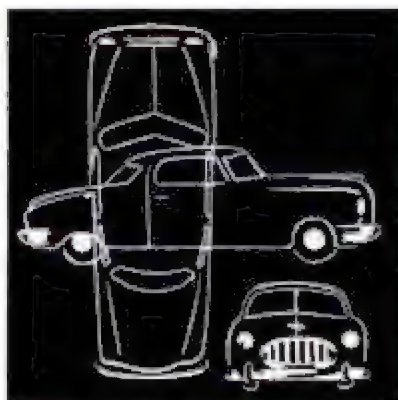
Harvesting the delicious nuts of Central America's Pifa palm is a tricky business. Two-inch-long thorns protrude from the tree trunk and climbing the tree can be downright unpleasant. One enterprising Panama native by-passed the customary practice of first burning the barklike outer layer from which the thorns protrude. He

built a homemade rig which allows him to pick record amounts. The device consists of two sets of two poles crossed near the front end. A permanent crossbar connects the widest span on each set. At the small end is a rope which passes around the tree. He moves the rig by alternately sitting on one crossbar and standing on the other.

Circuit Breakers Replace Fuses in Standard Fuse Boxes

Miniature circuit breakers are now available which screw into standard fuse boxes. When a circuit becomes overloaded, the breaker will cut the contact to protect the wiring system. The homeowner can tell at a glance which circuit has been broken, clear the cause of the overload and then re-establish contact merely by pushing a small button. This eliminates the need to replace a fuse. The breaker, available in three ratings, protects 15, 20 and 30-ampere circuits.





Detroit Listening Post

By Siler Freeman

THE SPRING QUARTER—traditionally the time of year for buying new cars and new homes—brings the automotive industry to its first test of the "sports car" market. This year almost every manufacturer has a candidate in the field and sales of the custom convertibles will be watched closely. These production-line sports models are priced high enough to make the test selective but highly important to the big manufacturers.

Kaiser-Frazer promises to have its plastic sports car in production by midsummer. If it succeeds, it will have the first of this type actually offered for sale. This, of course, does not include the special jobs being done on a small scale on the West Coast.

Kaiser-Frazer will also pioneer in another field this month. It will offer the latest and most simple (according to its makers) type of power steering. The unit was developed by the Monroe Auto Equipment Company and is hydraulic. Monroe claims to have perfected a smaller, more compact and cheaper unit than any now in the field. It is a direct-acting, booster type that forms part of the steering-linkage system and is operated by a standard-type hydraulic pump mounted on the engine. The operating valve and power cylinder are one unit.

Ford is being watched on the power-steering development. It is the only one of the larger car companies which has not yet offered it. Chrysler was first and General Motors is providing all of its divisions, as well as Lincoln, with its version.

There is reason to believe it won't be long before Ford and Mercury do something in this line. Power steering is being touted as the most important engineering feat since four-wheel brakes. A high automotive official stated recently that in five years a car without it will be obsolete.

Hardtops continue to dominate the new-car market. Last year this body style took a 15 percent jump over 1951. In two years, it became third in the list of body styles. This year it may rise even higher. Pontiac, as an example, has scheduled more than 30 percent of its production in the hardtop.

In addition, it has shown a four-door version of the hardtop. This still has some way to go due to engineering difficulties.

The station wagon has also shown great strides in customer acceptance. Ford, which claims leadership in this field as well as in convertibles, has put 10 percent of its production on its two popular steel-bodied station wagons.

Extension of the V8-engine trend appears to be halted temporarily. When gossip of 1954 models starts later in the year, there will be hints. But right now, V8 engines have run their course. There may be two new ones in 1954 but the remainder will probably wait until the 1955 models come out.

The 1953 spring market waits to be tested. The manufacturers are very optimistic. They have been producing at the rate of better than 7,000,000 passenger cars a year. Their plans for this quarter show scheduling on the up side, rather than down. Dealers, especially in the independent lines, have not been so optimistic. Early reception of the 1953 cars has been good, but dealers have found something of a problem in easing out the trade-ins. Many a dealer remembers the prewar days when a car merchant went broke because his used-car lots became jammed.

Manufacturers are certain their attractive new wares will make a 5,500,000 to 6,000,000-car year possible if their dealers go back to pursuing the customer instead of vice versa. They see the record number of buyers in 1950 ripe now for 1953 deals.

It looks like the public will be the winner. The buyer appears to be ready to resume his prewar role, dictating what he wants and getting it at what he thinks a fair price. If he can't get it new, he will have a pretty good selection of used cars from which to pick, and used-car prices will probably assume a much better relationship to new-car prices than at any time since before the war.

The independents appear to be in for tough going. The Big Three's percentage of the market showed almost a three percent increase early this year over 1952. It will be quite a scramble for smaller companies.

Giant Model Plane Flies 70 Miles Per Hour in Initial Tests



Believed to be the largest and most complete flying model airplane ever built, a $\frac{1}{12}$ -scale Strato-cruiser was airborne for more than three hours during its inaugural test in Tokyo. Four $\frac{3}{4}$ -horsepower engines, a retractable tricycle landing gear and a completely reproduced cockpit are some of the craft's realistic features. There are cabin and navigation lights for night flying. Made primarily of a lightweight wood, the model has a 12-foot wingspan and weighs 45 pounds. It was built in eight months by members

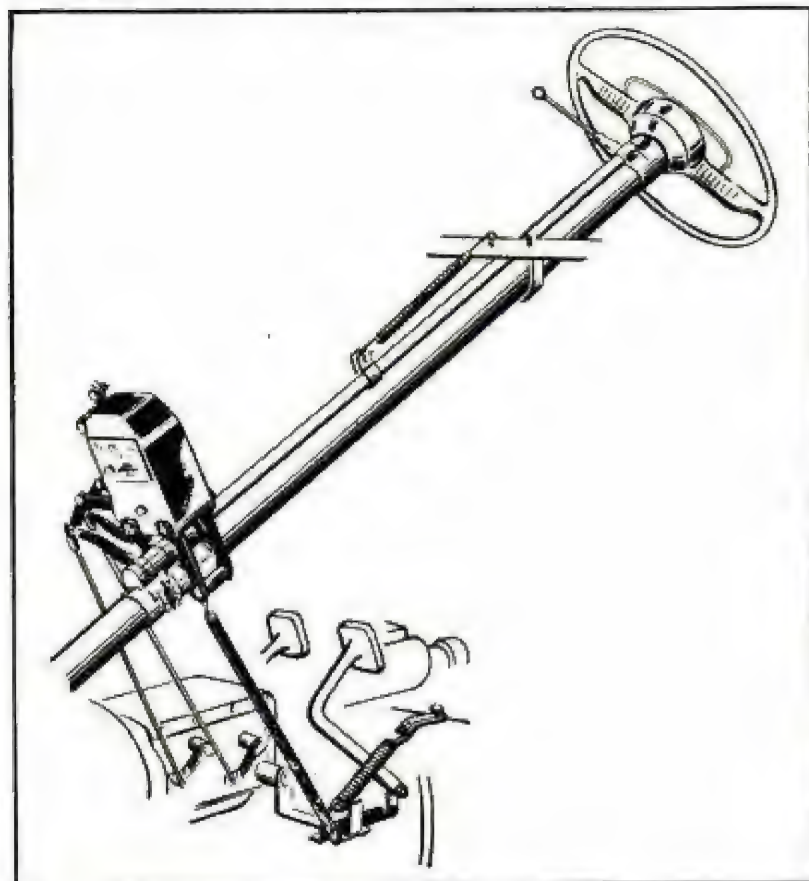
Plastic Strengthens Plaster Casts

Stronger, lighter and thinner casts for broken limbs result from use of a new plastic compound which fortifies plaster-of-paris bandages. Particularly suited to the needs of children, the new casts will not crumble under the influence of water or body chemicals. Weight of a plastic-reinforced cast is said to be about one half that of a conventional cast.

of a Japanese model-airplane club. Attached to two 200-foot steel cables that extend out from a special anchor-control pylon, the remotely controlled model flies its circular course at a top speed of 70 miles per hour. A third steel cable operates the retractable landing gear.

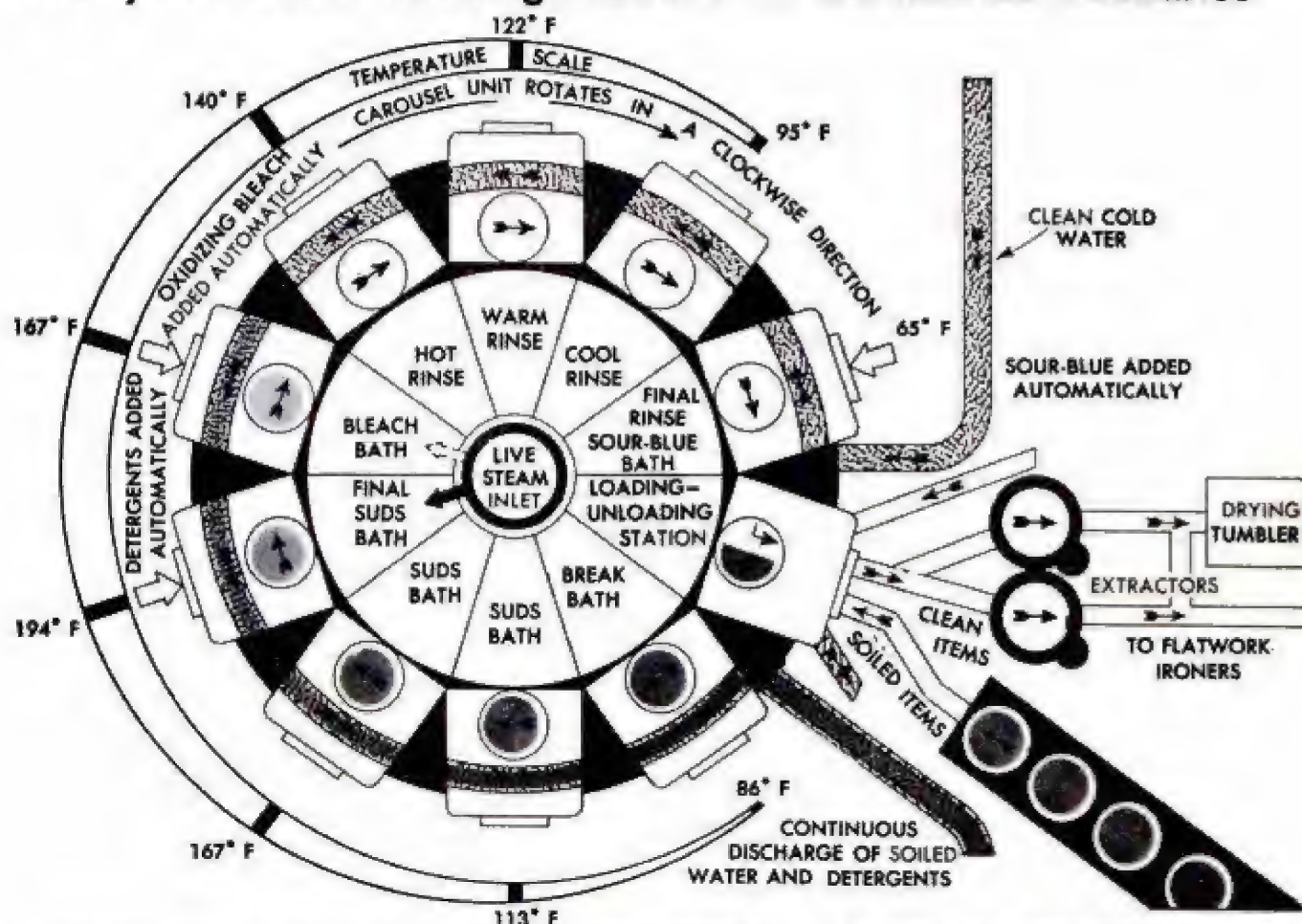
Winds of more than 1100 miles per hour, 65 to 100 miles in the sky, have been measured by radarlike instruments which calculate electronic activity.

Easily Installed Accessory Makes Standard Transmission Automatic

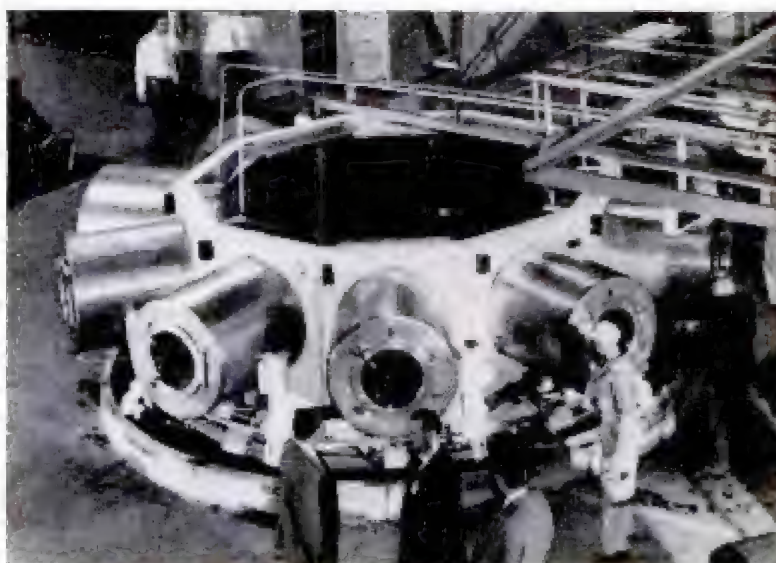


If you drive a Ford with a conventional hand-shift transmission, you can give it an automatic shift by installing a simple accessory on the lower end of the steering column. Installation takes about an hour. The unit is a small box that mounts under the hood and connects to the transmission by mechanical linkage. Inside the box are cams that synchronize the clutch-pedal movement with the shift operation. When you push down on the clutch pedal, a cam automatically shifts the transmission into the next gear. The only time you use the hand shift is to start out and to go into reverse or to go into low for a hard pull. The unit uses only the second and third gears. The manufacturer plans to make the device available to other cars in the future. It is claimed that the unit cuts shifting time in half and gasoline costs by 10 percent.

Merry-Go-Round Washing Machine for Commercial Laundries



Taking its cue from the automatic washing machine, a carousel-like unit for commercial laundries mounts 10 individual washers. Arranged in a circle facing outwards, the open-end units are loaded at one fixed station and pass clockwise around the hub through nine phases of washing, bleaching, rinsing and bluing. By the time the operator has filled the ninth washer, the tenth washer is ready for unloading and a refill. The thrifty unit uses the same water for all nine phases. Flowing in a counter-clockwise direction, a tubful of cool rinse water is changed into hot rinse by injected steam. Bluing and bleach are added, and finally detergent. When it has completed its cycle at the first



washing station, the water, now hot, dirty and full of suds, flows down the drain. One attendant operates the German machine.

Electronic Interpreters May Translate Foreign-Language Documents

It soon may be possible to translate foreign literature into English by means of an electronic machine, according to *Industrial and Engineering Chemistry*. The eye of the translator would be a scanner like those used in television cameras. The scanner, capable of distinguishing the printed words of a foreign language, would send electronic messages to a memory unit. The memory system, in which a vocabulary of

foreign words would be stored, would compare the impulses with its word storehouse. The translator would then convert the words to their English equivalents and feed them to an electric typewriter which would deliver the completed translation. The resulting word-for-word translation, though crude in form, would in most cases be understandable to one familiar with the subject matter.

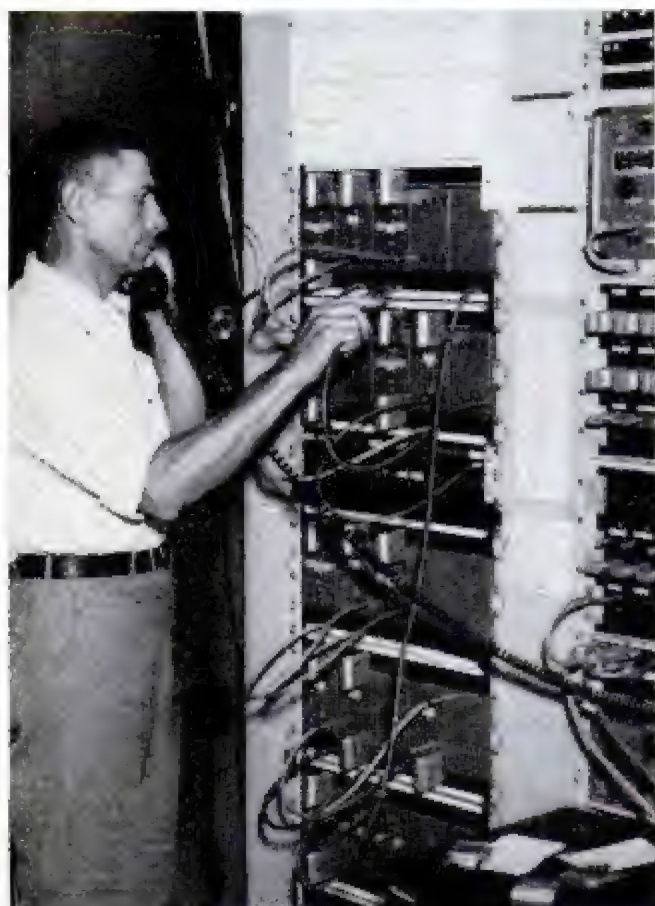


Microwave relay station on crest of 10,000-foot Mount Rose in Nevada is the highest in the United States

Trouble Shooters for the

By Jan and Bob Jensen

At control center in Denver, Merle Newton talks with Omaha as program is switched to emergency channel



HOLD IT! There's something in the road!"

Ed Lupe leaned forward to peer out into the swirling blizzard, as Bud Lyons, his companion, skidded the green Jeep truck to a halt. It was a bitter March afternoon and they had been fighting man-size drifts ever since heading up Rist Canyon's road, which twists out of Fort Collins, Colo.

"Hey! Looks like a woman. She's fallen!"

Springing from their truck, the two Denver maintenance men from the American Telephone and Telegraph Company's long-lines department hurried to assist the prostrate figure. The woman stirred, looked up at her rescuers, and mumbled through blue lips, "Car stalled. Up the road," then she lost consciousness again.

"We'd better hurry," said Ed grimly.

Rushing her back down the five miles to the general store at Bellevue they lingered just long enough for the doctor to reassure them she'd pull through. Then, quickly shrugging off their roles as heroes, the two men stamped out into the storm and pointed their truck up the canyon again.

Their real job lay ahead of them, for there was trouble at the microwave-radio station atop Buckhorn Mountain. The transcontinental-television circuit was out, and their engineering genius had to put this invisible chain stretching from New York to



Newton checks filament voltage on amplifier panel

TV Skyway

California back on its course, so that Jimmy Durante's schnozzle might continue eastward after skidding to a halt somewhere on the salt flats of Utah and Sid Caesar might bounce westward by evening. But the short delay of less than an hour had given the storm time to clog the canyon road.

"Looks like it's snowshoes for the rest of the trip," grunted Ed Lupe.

"Yeah," agreed Bud. "Wish I had a nickel for every time I've tracked up Buckhorn on these overgrown tennis rackets."

An early dusk had enclosed the whipped-cream wilderness by the time they finally strode around Buckhorn's last curve and out on the broad knoll where all that was visible of the relay station were patches of its black roof sticking out of the drifts.

It did not take long for the two microwave maintenance men to replace the faulty tube causing the break in the relay system, and by evening, television was once again skimming across the continent. Then, rolling out the emergency beds, and opening a can of beans from the supply cupboard, Ed Lupe and Bud Lyons turned in.

If tired muscles kept them in a brief state of insomnia, instead of counting sheep, they could have ticked off the 107 other relay stations spaced every 30 miles or so across

Aerial tramway (right) carries men and equipment the last thousand feet up the slope of Mount Rose





Huge electronic lenses of Buckhorn tower connect to microwave pipes that carry impulses to and from station

Maintenance engineer Merle Newton makes a routine repair on the 12-volt rectifier-control equipment at the Buckhorn Mountain relay station in Colorado



the three thousand miles from coast to coast. They might concentrate on the 415-foot tower at Des Moines, the tallest along the route, or a short, stubby rascal like the 2½-foot platform built to counteract the reflections from the Salt Lake flats.

A chain of sharply focused radio beams, using frequencies between 3700 and 4200 megacycles, or a wave length of approximately three inches, is used to transmit television and telephone messages for long distances. Four billion of these tiny twentieth-century "carrier pigeons" pass a given point every second, flashing from Times Square to the Golden Gate. Often following the pioneers' trail, they dip lightning wings along the way—New York, Philadelphia, Pittsburgh, Chicago, Omaha, Denver, crossing the continental divide at Creston, Wyo., 7182 feet above sea level, over Pratts Pass outside of Salt Lake City, hurdling the high Sierras at Mount Rose, Nev., finally swooping into San Francisco—squeezing a nation into a rib-crushing bear hug. The stations are not placed in a straight line, but run zigzag to prevent the signal from overshooting the tower and bouncing off antennas farther along.

As the microwave touches each relay point, it's given a booster shot by the powerful receiving and amplifying equipment contained therein, concentrated into beams by the use of special electronic lenses, and aimed accurately from one antenna atop the tower to the next station. If it were possible to catch this intangible substance in a slow-speed Walt Disney animation at one such

stop, a radio wave about the length of a ten-penny nail would slide from the antenna down the hollow-tube wave guides, whiz through the amplifier for its rejuvenation and flit nimbly back up the opposite side of the tower to be catapulted into space once again. Less than one watt of radio-frequency power is required to bridge the distance between relay points.

This is the story of the men behind the Bell System's \$40,000,000 project—men, like Lupe and Lyons, who service a sky highway and keep alert fingers on the thrilling pulse which now beats steadily across America.

"I never saw the ground once the whole time we were building the tower at Blue Mountain, Pa.," a lean foreman relates. "The clouds just closed in on us right from the beginning, and it felt like Saint Peter was huffing down your neck, working up there on those girders, not being able to see the fellow next to you, just hearing the clank of hammers against steel."

"Ever try lifting heavy antennas into place in a 60-mile Wyoming gale?" growled a sunburned construction man. "They whipped like sheets on a clothesline."

Building the Mount Rose, Nev., station, which tips the route at its highest point, was the headache spelled with a capital migraine. Just getting to the top of its two-mile-high, snow-packed summit in freezing March weather took a bit of doing. "The first mile and a half in elevation," one of



Television-maintenance men complete last lap of journey by snowshoe to microwave relay station at Cisco Butte, Calif.

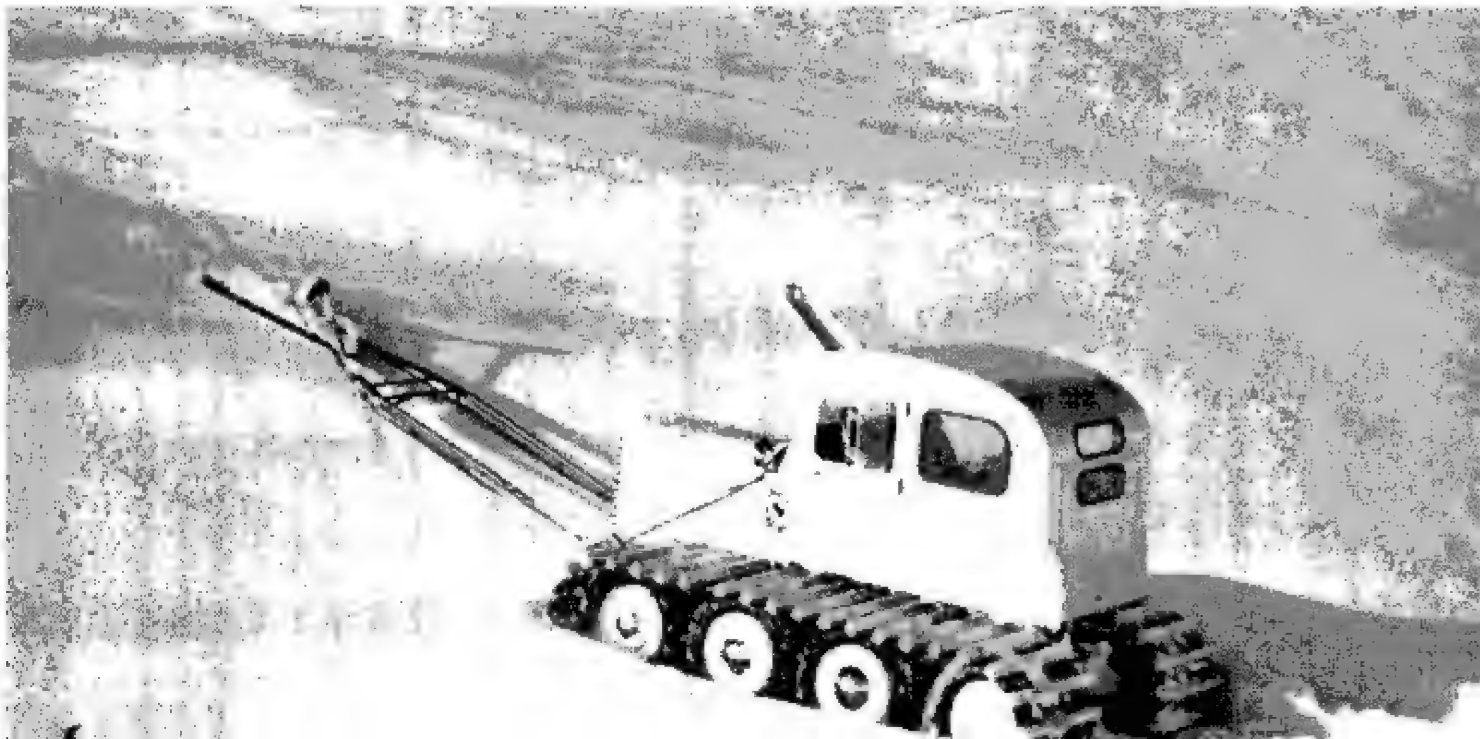
the crew said, "we piled our equipment into a tractorlike truck called a Sno-Cat. The going was fairly simple for a while, but even it balked at the last thousand feet."

"Yeah," agreed another, "then we had to transfer ourselves and gear to a flat stoneboat, hook a rope around a special ski tow the telephone company installed and, hanging on for dear life, jerk to the top by inches."

Then there were the tin-hatted young men who rode the hoist up the framework

(Continued to page 240)

"Sno-Shu" starts climb. Runner prevents front end from digging in, helps tractor over steep and uneven surfaces



Automatic Dry Cleaner

SIXTY GARMENTS an hour are processed by a compact automatic unit which dry cleans and presses in 40 minutes. Larger than the original test model, the manufactured article will be about 20 feet long, 8 feet high and 7 feet deep. Along the top of a recessed section in front runs a constantly moving conveyor line. The soiled garment is treated for spots, placed on an ordinary wire hanger and suspended from the conveyor. It passes first through closure rollers which keep heat and spray inside the machine. Vertical perforated steam pipes soften the garment with jets of

steam and an overhead drenching outlet drops the initial cleaning solution. It proceeds around a corner to the first cleaning squeezer, padded boards which squeeze gently back and forth as the garment is soaked with soap from an overhead source. A dry squeezer is next. Then follows a jet spray of clear solvent, both from vertical perforated pipes and an overhead outlet; a final dry squeezing, closure rollers, a long trip through the heat chamber and the garment finally emerges clean and dry from the closure rollers at the other end. Often, no additional pressing is needed.

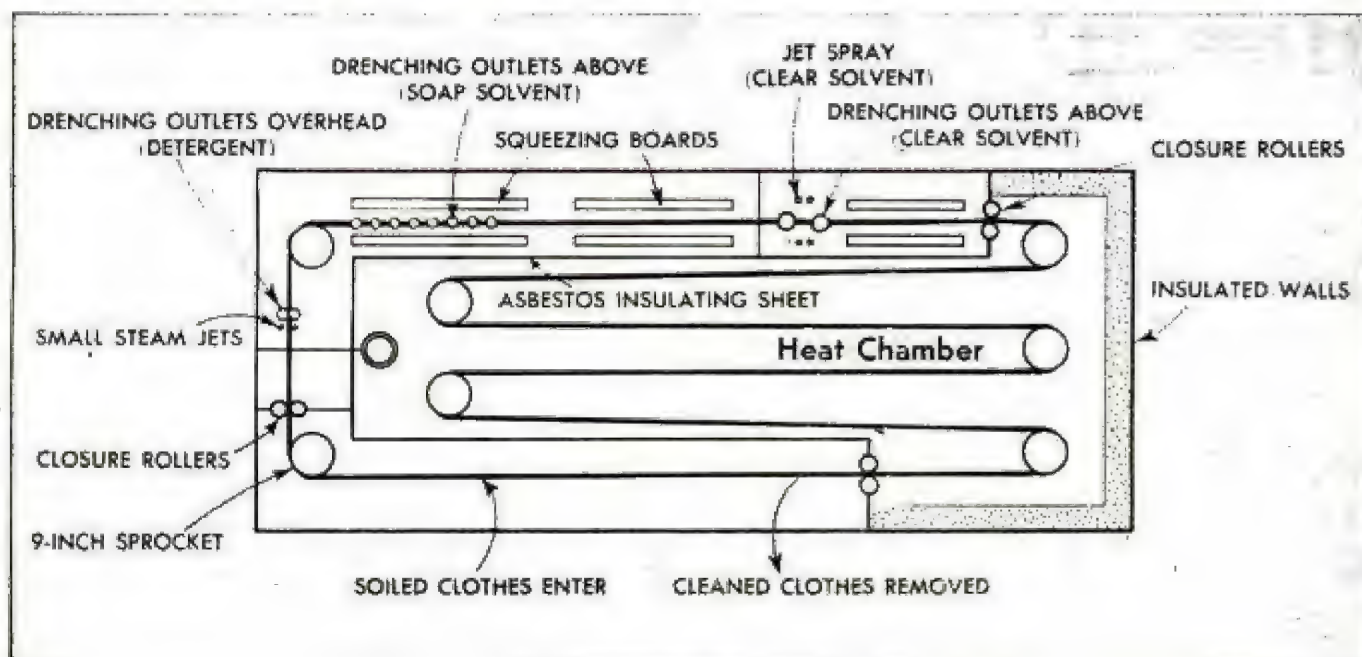


Dress is placed on conveyor as coat disappears between closure rollers which keep heat and spray inside



Cleaned coat emerges from squeezer boards at left and passes into heat chamber. Door is normally closed

Constantly moving conveyor takes clothes through complete cleaning process. Garments never leave hangers



Thin-Wall Refrigerator of the Future Saves Kitchen Space



Forming part of the wall between kitchen and dining room, an experimental General Electric refrigerator is said to take up half the space occupied by conventional models. Ultrathin insulation 10 times as efficient as standard packing is the main reason for its compactness; wall thickness is one half inch instead of three inches. The refrigerator actually has two fronts, and can be opened as easily from the dining-room area as from the kitchen. Doors of the experimental cooler are magnetically sealed, and are opened by means of finger grips at the base.

Study Douglas-Fir Beetles to Prevent Future Tree Damage

Tree-killing Douglas-fir beetles are being trapped on an Oregon tree farm in an effort to study the life and breeding habits of the minute insects. The tiny bugs have wreaked wholesale damage on the tall timber of the Northwest; in one 205,000-acre area, they destroyed more than 300,000,000 board feet in one year. Made of copper screening, large funnels and pint fruit jars, the traps catch mature beetles as they emerge from the bark. The beetle, smaller than a match head, bores into a tree to deposit eggs beneath the bark. The eggs hatch into larvae that mine out the layer of wood through which the tree pumps moisture and nutrients from the soil. After maturing, they emerge from the bark to attack other timber. So far, the only solution is to harvest the infected trees.



Thermostat Regulates Temperature in Plant Incubator



Artificial heat supplements solar heat in a combination hot bed—cold frame for starting small plants. Temperature of the air is thermostatically controlled and ventilation is automatic. A valve, operated from without, regulates a fine-spray irrigation. Eight small light bulbs provide heat when the sun's rays are lacking. The removable metal center sash rests on a plywood base, is chain-secured to prevent damage from wind or storm. The unit is six feet wide by three feet deep.

AVERAGE
19.5 M.P.G.

POPULAR MECHANICS OWNERS POLL
CONDUCTED BY FLOYD CLYMER

1. I own a 1952 Ford: V-8 ☐ 6-cylinder ☒
 2. I use regular gasoline ☒ Premium (high test) gasoline ☐
 3. Average gasoline mileage in city: 17 m.p.g.; in country: 23 m.p.g. with overdrive
 I change oil every 5,000 miles.
 4. Oil consumption: One quart every 3,000 miles.
 5. My Ford is equipped with: Conventional 3-speed transmission ☐
 Conventional transmission with overdrive ☒
 Ford-O-Matic Drive ☐
 6. If you have Ford-O-Matic Drive, what is your opinion of it? Adequate ☐ Poor ☐
 Excellent ☐ Good ☐
 What troubles have you had with your Ford-O-Matic transmission?

7. Roadability at high speeds: Excellent ☒ Good ☐ Unsatisfactory ☐
 8. Maneuverability in traffic: Excellent ☒ Good ☐ Unsatisfactory ☐
 9. Acceleration: Excellent ☐ Good ☒ Adequate ☐ Poor ☐
 10. What is the most satisfactory cruising speed of your Ford? 70 m.p.h. in overdrive
 11. My Main reasons for buying a Ford: good looks, economy

12. If you own the V-8 engine, do you like its side valves - or would you prefer over-head valves, as in the Ford 6-cylinder engine? Side valves ☐ Overhead ☐

13. Rate these points:

- | | | | |
|---------------------------------|--|--|----------------------------------|
| Visibility, forward: | Like <input checked="" type="checkbox"/> | Acceptable <input type="checkbox"/> | Dislike <input type="checkbox"/> |
| Visibility, rear: | Like <input type="checkbox"/> | Acceptable <input type="checkbox"/> | Dislike <input type="checkbox"/> |
| Riding qualities: | Like <input type="checkbox"/> | Acceptable <input checked="" type="checkbox"/> | Dislike <input type="checkbox"/> |
| Horsepower output: | Like <input type="checkbox"/> | Acceptable <input type="checkbox"/> | Dislike <input type="checkbox"/> |
| Exterior body styling: | Like <input type="checkbox"/> | Acceptable <input type="checkbox"/> | Dislike <input type="checkbox"/> |
| Interior body styling: | Like <input type="checkbox"/> | Acceptable <input type="checkbox"/> | Dislike <input type="checkbox"/> |
| Suspended clutch & brake pedal: | Like <input checked="" type="checkbox"/> | Acceptable <input type="checkbox"/> | Dislike <input type="checkbox"/> |

14. Specifically, what are your complaints on the Ford? too many rattles
 tappets need adjusting too often

15. Have you ever owned a Ford before? Yes ☐ No ☒ How many? _____
 16. Would you buy another Ford? Yes ☒ Possibly ☐ No ☐
 17. How is your dealer service? Excellent ☐ Good ☒ Average ☐ Poor ☐
 18. An overall rating of your Ford: Excellent ☐ Good ☒ Average ☐ Poor ☐
 19. What specific improvements do you want in your next car?
 a little more horsepower, a little tighter body

Write additional comments on reverse side. This questionnaire will be tabulated fairly and your name will be held in strict confidence.
 Thank you.

Mail promptly to:

FLOYD CLYMER
Popular Mechanics Owners Poll
1268 So. Alvarado St.
Los Angeles 6, California

YOUR NAME: [redacted]
 STREET: [redacted]
 CITY & STATE: Los Angeles, Calif
 OCCUPATION: Television Serviceman



73% USE
REGULAR

57%
EXCELLENT
38% GOOD

BIGGEST
REASON FOR
BUYING
POLL SHOWS

97.5% LIKE THIS

MOST FREQUENT
COMPLAINT

52% RATE CAR
EXCELLENT IN POLL



The OWNERS REPORT on the FORD SIX

The true test of a car begins when the owner takes the wheel. Popular Mechanics sent questionnaires to 1000 Ford owners. Here is what they have to say

By Floyd Clymer

THE FACT THAT an extremely high number (78 percent) of the owners reporting in our Ford survey had owned one or more Fords previously is a testimonial to the motoring public's persistent faith in Ford throughout the years.

In answering our questionnaires this year, Ford owners as usual pull no punches. They tell what they like and what they don't like. The reasons why a large percentage of owners stay in the Ford family vary from year to year, but this survey was typical. Mechanical features and styling show up as the principal reasons for buying Fords, but a large number gave as their reason for satisfaction this point, as voiced by a Salem, Ore., truck driver:

"The Ford seems to be such an easy car to get parts for. All towns, no matter how small, usually have the necessary repair parts for radiators, heads, frames, fans, starters, generators and steering systems... In case of an accident anywhere, you get going quicker and for less."

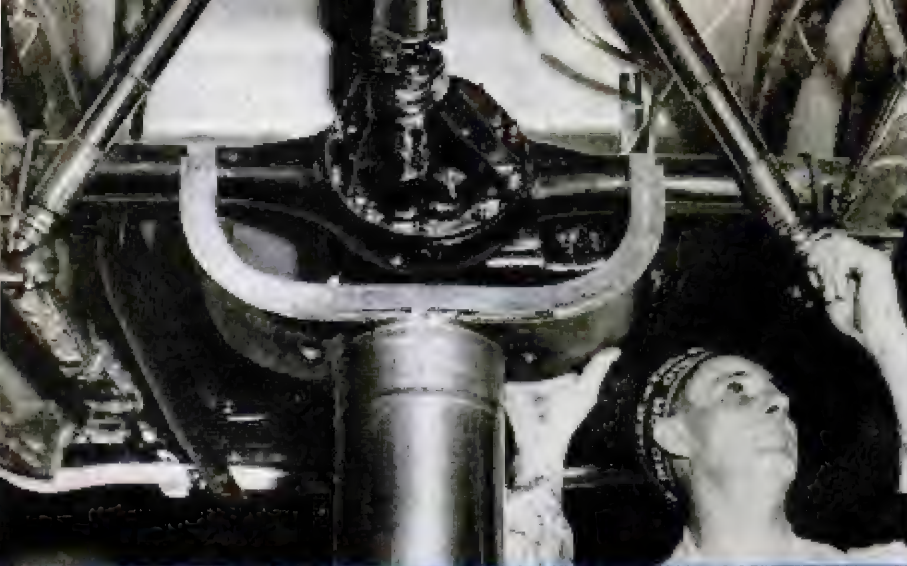
A large percentage increase of Ford Six owners was shown in the current poll. However, owner satisfaction was more evident among owners of the V8 than the Six: Seven percent of the Six owners said they would not buy it next time, but only a tiny one percent of V8 owners indicated it would not be their next buy.

These drivers have been wheeling their cars around for thousands of miles and their comments are from personal experience. Most have owned their cars for 6 to 10 months, because change-over time in Detroit made it necessary for us to poll owners of 1952 Fords. We made the Ford Six the principal subject of this survey, but to check the improvements in 1953 models I made my own test in the '53 Ford Six. The differences between the two years are minor and have little effect on anything except riding comfort.

Fordomatic proved another very strong feature. Of owners who had this transmission, 60.5 percent reported it excellent, 37

Owners gave styling as principal reason for buying a Ford Six. Economy ran third in poll. Clymer tested this four-door model





ECONOMY TEST

1953 FORD SIX CUSTOMLINE FORDOR SEDAN
WITH FORDOMATIC DRIVE

MILES PER GALLON



Miles Per Gallon

At constant 30 m.p.h.	27.2
At constant 50 m.p.h.	24.3
At constant 60 m.p.h.	20.6
At constant 75 m.p.h.	15.4

Cross-Country Mileages

Los Angeles to Fresno, Calif. (over Tehachapi Mountains via the "Ridge Route")	19.7
Fresno to Los Angeles (over Pacheco Pass and return via "Coast Route")	22.3

Nonpremium gasoline of various brands was used during test.



Big news in the 1953 Ford is improved riding qualities. Rear-end stability is increased by "sea leg" mounting of shocks

percent good, 2.5 percent average and none poor. That's a remarkable owner tribute to any automatic transmission.

Our question: "Specifically, what do you dislike about the car?" brought the usual variety of answers. The predominant complaint for Ford was body rattles.

Excessive vibration was observed by a Pitman, N. J., convertible owner, who said: "The whole car shakes so much that one gets a constantly blurred picture when looking into the rear-view mirror."

Other complaints include:

"The Ford Six OHV is underpowered for Fordomatic. The transmission is very smooth, but should have four speeds forward. I also object to the slow downshift response for passing purposes or on hills."—Pekin, Ill., printer.

"Doesn't have the snap of previous models."—Long Beach, Calif., factory worker.

"It does not have self-centering action, but wanders slightly from side to side."—Los Angeles painter.

"Dealers load new Fords with every accessory imaginable and then tell the public that the cars were equipped at the factory while, in most cases, the dealers themselves load them."—Baltimore, Md., radar technician. (A common complaint in all our surveys on all makes.)

"Chrome is very poor. I would rather have stainless steel."—Ashland, Ky., chemical-plant foreman. (You'll be getting some this year.)

Owners of all makes of cars think they should get more gasoline mileage and Ford owners hew to the line in this respect. Ford Six owners reported 19.5 miles per gallon in the country and 15.9 miles per gallon in the city.

"I'd like better mileage, but all automatic drives are 'gas hogs.' Fordomatic is by far the best

Arrow points to new rubber bumper, part of the redesigned suspension system that Clymer says has cut road shock greatly

Percentages From PM Owners Poll

	V8	Six
Owners of V8 models.....	57%	—
6-cylinder models.....	—	43%
Owners using regular gasoline.....	50%	73%
premium gas.....	50%	27%
Average gasoline mileage		
in country.....(m.p.g.)	18.5	19.5
in city.....(m.p.g.)	15.3	15.9
*Overdrive-equipped models averaged 3.2 m.p.g. higher than cars with conventional transmissions.		
Average mileage		
for adding one quart oil.....	1630	1197
for change of oil.....	1880	1756
Owners having		
conventional transmission.....	44%	52%
conventional with overdrive.....	18%	28%
Fordomatic drive.....	38%	20%
Owners' rating of Fordomatic drive		
excellent.....	68%	53%
good.....	32%	42%
average.....	0	5%
poor.....	0	0
Roadability excellent.....	56%	57%
good.....	40%	38%
unsatisfactory.....	4%	5%
Maneuverability excellent.....	78%	75%
good.....	22%	25%
unsatisfactory.....	0	0
Acceleration excellent.....	58%	52%
good.....	35%	35%
adequate.....	7%	11%
poor.....	0	2%
Average cruising speed reported (m.p.h.)	61	56
Previous owners of Ford cars.....	86%	70%
Previous owners of five or more Fords..	17%	18%
Owners who will buy another Ford....	70%	68%
might buy another Ford..	29%	25%
will not buy another Ford	1%	7%
Owners rating dealer service excellent..	28%	33%
good.....	34%	30%
average.....	27%	24%
poor.....	11%	13%

OWNERS' OVER-ALL RATING OF CAR

Excellent.....	50%	52%
Good.....	41%	34%
Average.....	8%	12%
Poor.....	1%	2%

CHIEF PURCHASE REASONS

(in order of popularity)

	V8	Six
Mechanical features.....	1	4
Styling features.....	2	1
Purchase conditions.....	3	2
Previous Ford ownership.....	4	5
Economy of operation.....	5	3
Driving ease.....	6	6

OWNER COMMENTS ON PARTICULAR FEATURES

	Like	Acceptable	Dislike
Visibility, forward.....	97.5%	1.5%	1.0%
Visibility, rear.....	95.5%	4.0%	.5%
Suspended foot pedals.....	93.0%	5.0%	2.0%
Exterior body styling.....	93.0%	7.0%	0
Interior body styling.....	81.0%	18.0%	1.0%
Riding qualities.....	68.0%	28.5%	3.5%

MOST FREQUENT COMPLAINTS:

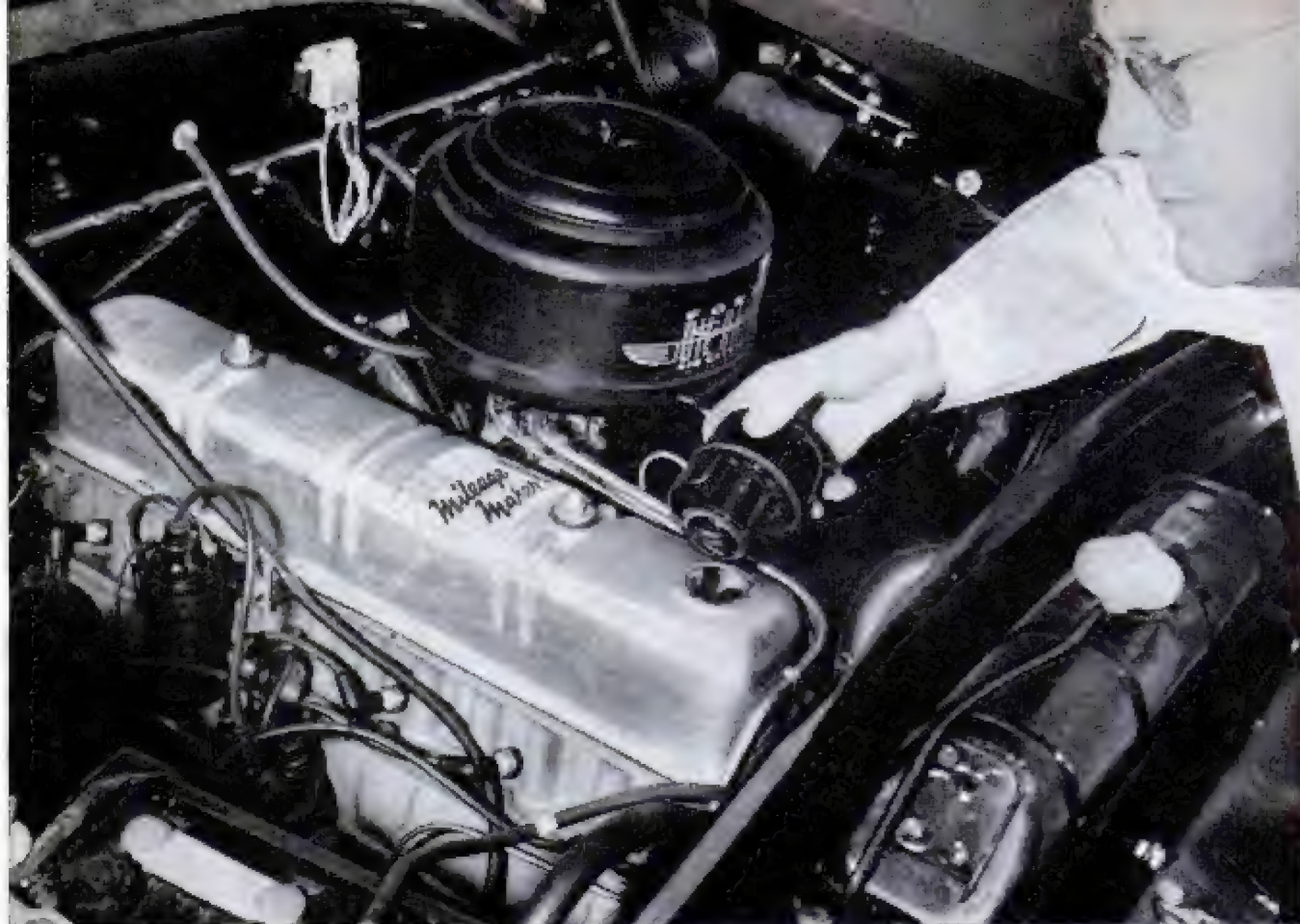
	Order of Frequency	
	V8	Six
Rattles, body squeaks.....	1	1
Low gasoline mileage.....	2	3
Mechanical difficulties.....	3	2
Engine noisy.....	4	—
Rear of car too light.....	5	7
Low power.....	6	6
Poor paint or chrome.....	7	5
Steering or handling qualities.....	—	4

IMPROVEMENTS DESIRED IN NEXT NEW CAR:

	Order of frequency	
	V8	Six
Better body workmanship.....	1	1
Increased gasoline mileage.....	2	3
Increased power and acceleration....	3	5
Overhead valves.....	4	—
Automatic transmission.....	5	—
Improved mechanical items.....	6	4
Improved riding qualities.....	7	7
More stable steering and handling....	—	2
Better paint and chrome.....	—	6

Clymer agrees with Ford owners that roadability is excellent. Some owners did complain of steering qualities





Oil-filler cap on the overhead-valve six is convenient. Average owner adds a quart of oil each 1197 miles

automatic transmission. It is smoother and has less jerks because it always drives through the torque converter."—Los Angeles doctor.

Here are some frequently reported reasons for buying a Ford:

"They have always been as good or better than any other car in the low-price field."—Canton, Ohio, foreman.

"I received good all-around economical service from my '51 Ford, and improvements were available in the '52 model."—Chanute, Kans., insurance salesman.

"It will stand sustained high-speed driving better than the average low-price car."—Baker, Ore., salesman.

"It gives me everything an expensive car would and is not hard to move every two years. Also, I like the styling better than that of any other car."—Mansfield, Ohio, exterminator.

"I travel 40,000 miles a year, and I find Ford needing the least amount of repair. When repair is needed, the cost usually is more moderate than for other cars."—Canton, Ohio, traveling salesman.

"What specific improvements would you like to see in your next car?" is a question we never fail to ask. Some of the answers were:

A Baltimore, Md., advertising-production man and others want a larger glove compartment.

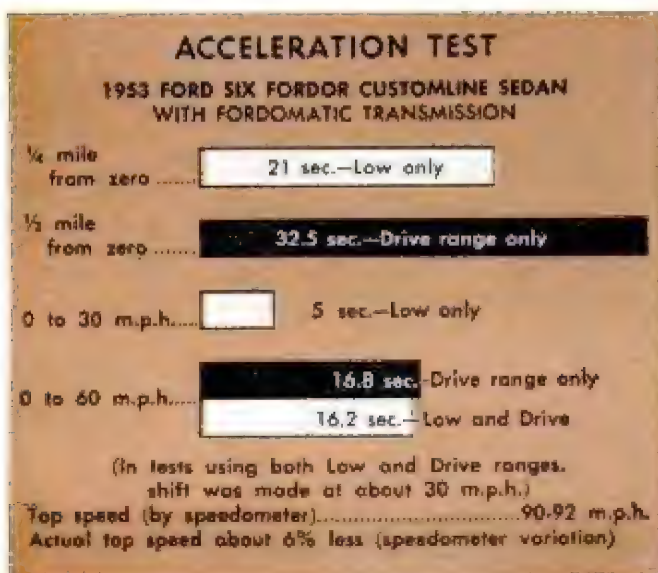
A Lynchburg, Va., advertising manager wants "a body without a hump in the middle."

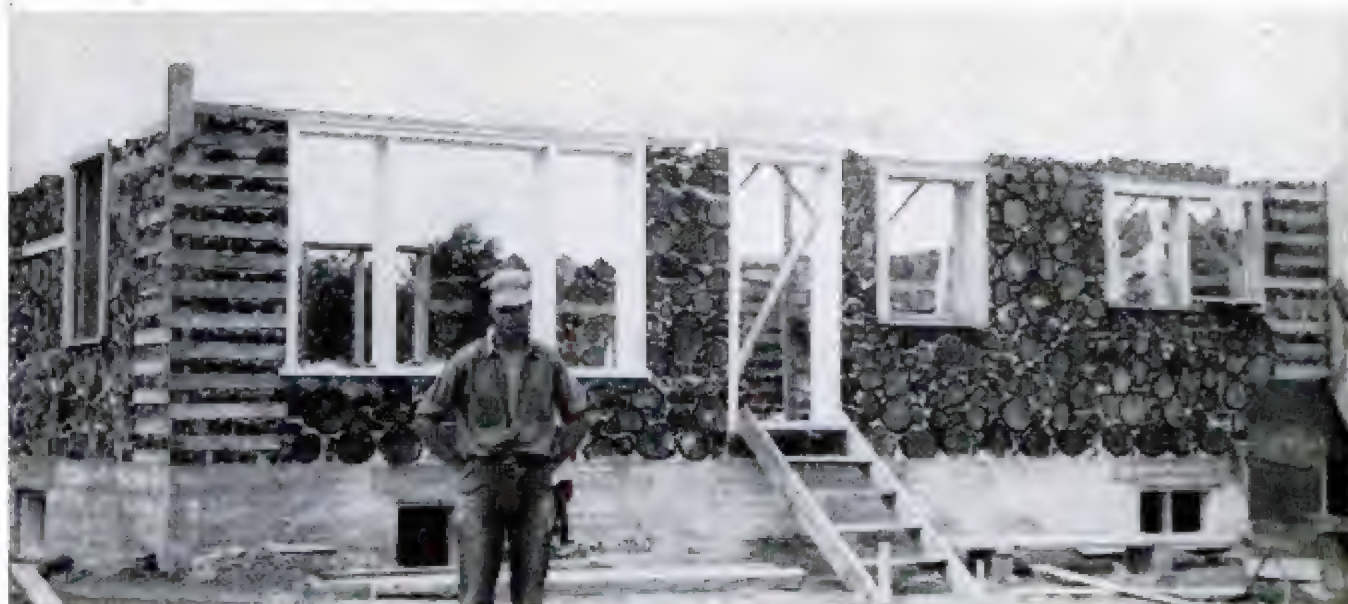
An Ohio truck driver, explaining that he weighs 265 pounds, wants stronger front seats. "I like a two-door model, but had to get four doors to get stronger seats."

The temperature gauge should be calibrated instead of reading "cold" or "hot," and the gasoline gauge should be in gallons, not reading "empty" and "full," a New London, Conn., research mechanic suggested. (I agree.)

A Birmingham, Ala., chiropractor would like to see an inside release for the trunk as well as for the hood. And it would add little to the total cost to provide left-foot

(Continued to page 262)





Modern Cabin Uses Short Lengths of Logs Mortared Like Stone

With a new approach to a frontier-age type of housing, John Mascoe of Ottawa, Ont., Can., is building a log cabin in which the logs face the "wrong way." Instead of laying logs from corner to corner to form the wall, he cuts them in lengths of 10

inches and mortars them in as if they were cinder blocks or stones. The sawed ends which form the wall surface will be finished later with several coatings of varnish. Mascoe believes that the finished product will last indefinitely.

"Poor Man's Corn" Proves Excellent Value in Vegetable Diets

Teosinte, a plant native to Mexico and Central America, has been discovered to be an excellent aid to good nutrition, especially for persons forced to live on vegetable and cereal diets. The plant is the closest relative of corn and is known as "poor man's corn." Its kernels are smaller than corn kernels and have a hard, inedi-

ble hull. Scientists of Iowa State College, working at the Guatemala Research Center, have discovered that teosinte contains more total protein than corn, and more than twice as much of the amino acid, methionine, as corn. Lack of methionine is what makes a predominantly vegetable diet such poor nourishment.

Combined Tent and Portable Garage Mounts on Automobile

Supported by steel pipes mounted directly on the car, a tarpaulin garage also acts as a sleeping tent or sunshade. Just by snapping side curtains together, protection against snow, rain or cold is afforded. Side posts allow conversion to a sunshade for picnics and daytime camping; addition of side curtains to the sunshade turn it into a roomy tent for sportsmen.

Twenty-five million acres of American soil are now irrigated by canals that would circuit the globe $5\frac{1}{2}$ times.

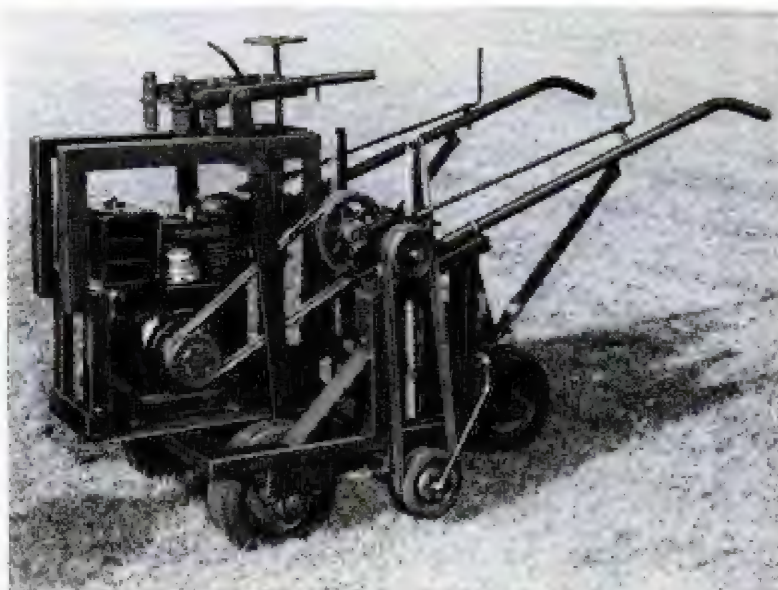




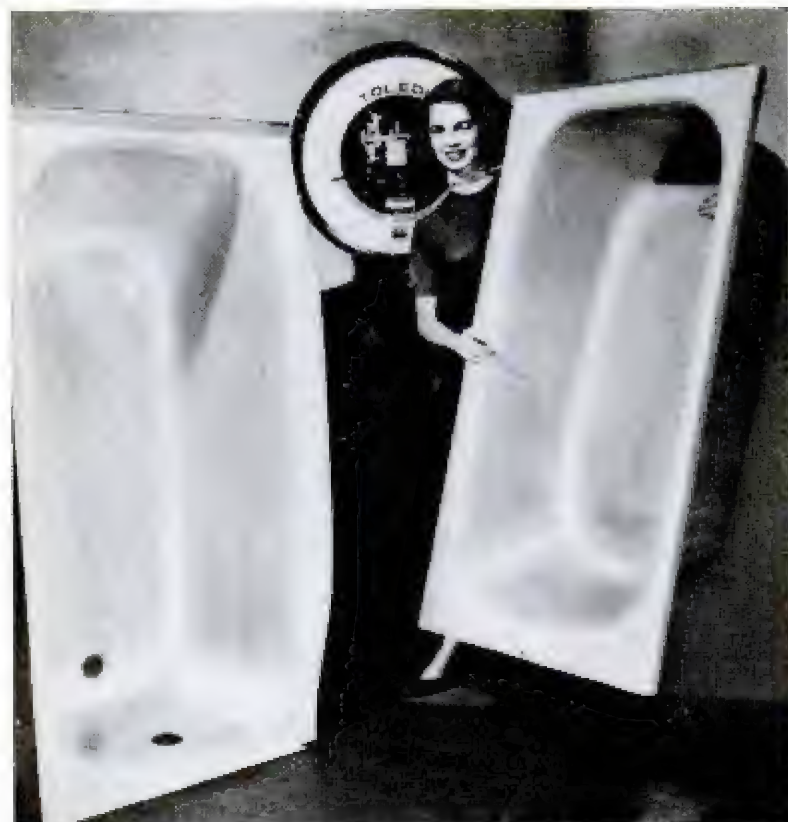
Cutter produces uniform pieces of desired length. Below, eight-horsepower engine drives the vibrating blade

Power Sod Cutter "Walks" Along Ground

From 1 to 1½ acres of sod per day can be cut with a power machine that moves along at normal walking speed. The machine simultaneously cuts along both sides and underneath a strip of sod 16 inches wide. The operator can adjust the machine to cut the strip into blocks of any desired length. The depth of cut can be varied from ¾ inch to 2 inches. Weighing 700 pounds, the machine follows the ground contour to produce sod of uniform thickness.



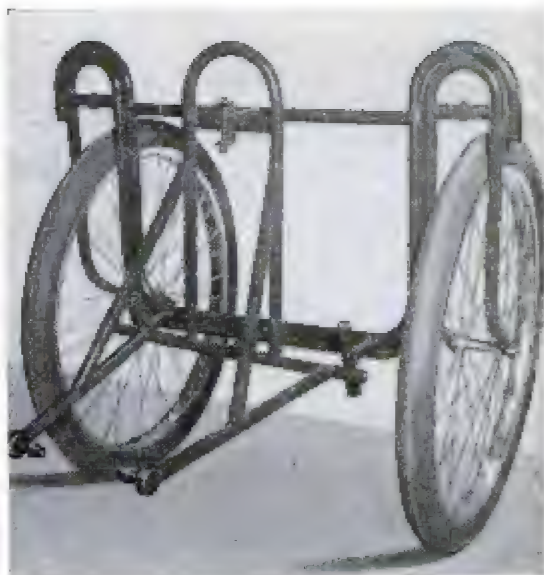
Featherweight Bathtub Made of Glass Fiber Resists Damage



Weighing only 17 pounds, a glass-fiber bathtub can be picked up and carried by one hand. Shipping and handling costs are much lower for the new tub, which has the same dimensions as conventional steel tubs which weigh 180 pounds. Strong and sturdy, it resists chipping and denting.

Ultrarapid Freezing Keeps Cells Alive

Ultrafast freezing of body tissue will keep it alive for weeks, according to Dr. Basile J. Luyet of St. Louis University. Luyet has kept cells from the heart of a chick embryo alive for one month, frozen at about 350 degrees below zero Fahrenheit. His quick-freeze method lowers the temperature of the cells several hundred degrees per second, so fast that damaging crystals have no time to form.



Two-Wheel Bicycle Trailer Transports Heavy Loads

Designed to carry loads of several hundred pounds, a two-wheel bicycle trailer facilitates the work of newsboys, delivery boys and repairmen. Easily maneuverable in traffic, the trailer also adds stability to

the bicycle itself, preventing it from tipping over. An attachment for a passenger seat in place of the carrying compartment will soon be available. Only chassis fittings are now provided.



Stainless-Steel Hub Caps Simulate Wire Spokes

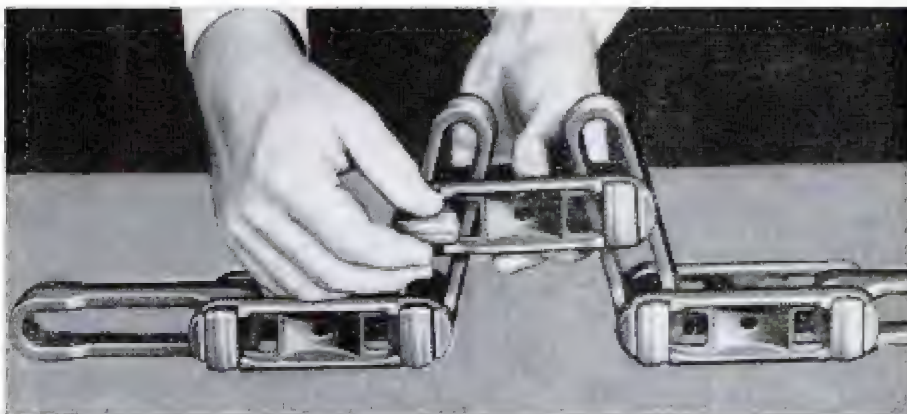
Hub caps that look like chrome-plated wire wheels allow the sports-car owner to add sparkle at one third the cost of spoke wheels. The hub caps are made of stainless steel and the spokes are inserted in ferrules around the rim. The retail price is about \$100 for a set.

Permanent Front-Wheel Packing

You can forget about repacking front-wheel bearings when you use a lubrication wick that the manufacturer claims will provide lubrication for 100,000 miles. The wick is soaked with grease and packed inside the wheel. The principle is said to be the same as used by railroads.

Conveyor Chain Easily Connected

No tools are needed to connect or disconnect links of a conveyor chain which won't disassemble while in service. There are only three component parts to the chain: A main link, a sidebar link, and a connecting pin. During connection, the pin is inserted and given a quarter turn until it drops into a locking position behind a ridge on the sidebar link. The simple design of the chain, which



makes it difficult for small particles to clog, suits it to dragline work or use around farms, mines and road-construction areas.



This concrete-block house on a slab foundation was built by unskilled owner during two years' spare time

Here's the House I Built for

\$3500

By W. G. Waggoner

In center of double clothes closet, Waggoner built chest of drawers



BUILDING my castle in Sacramento, Calif., was not a bit less staggering to me than the Pentagon building must have seemed to the contractors who did that job. As a white-collar worker, hanging a picture was a major project.

The thing that got me started was a radio program which told how to build a dream home in a few months' spare time for \$3500. Actually, it took me two years of "blood, sweat and tears" to do it. But what a satisfaction! I hired only 10 days of skilled labor, mostly for plumbing and electrical work.

From laying the foundation to the last roll of the paint roller, the *Popular Mechanics Concrete Block House* book was my construction bible. I easily adapted the instructions to my own house plan.



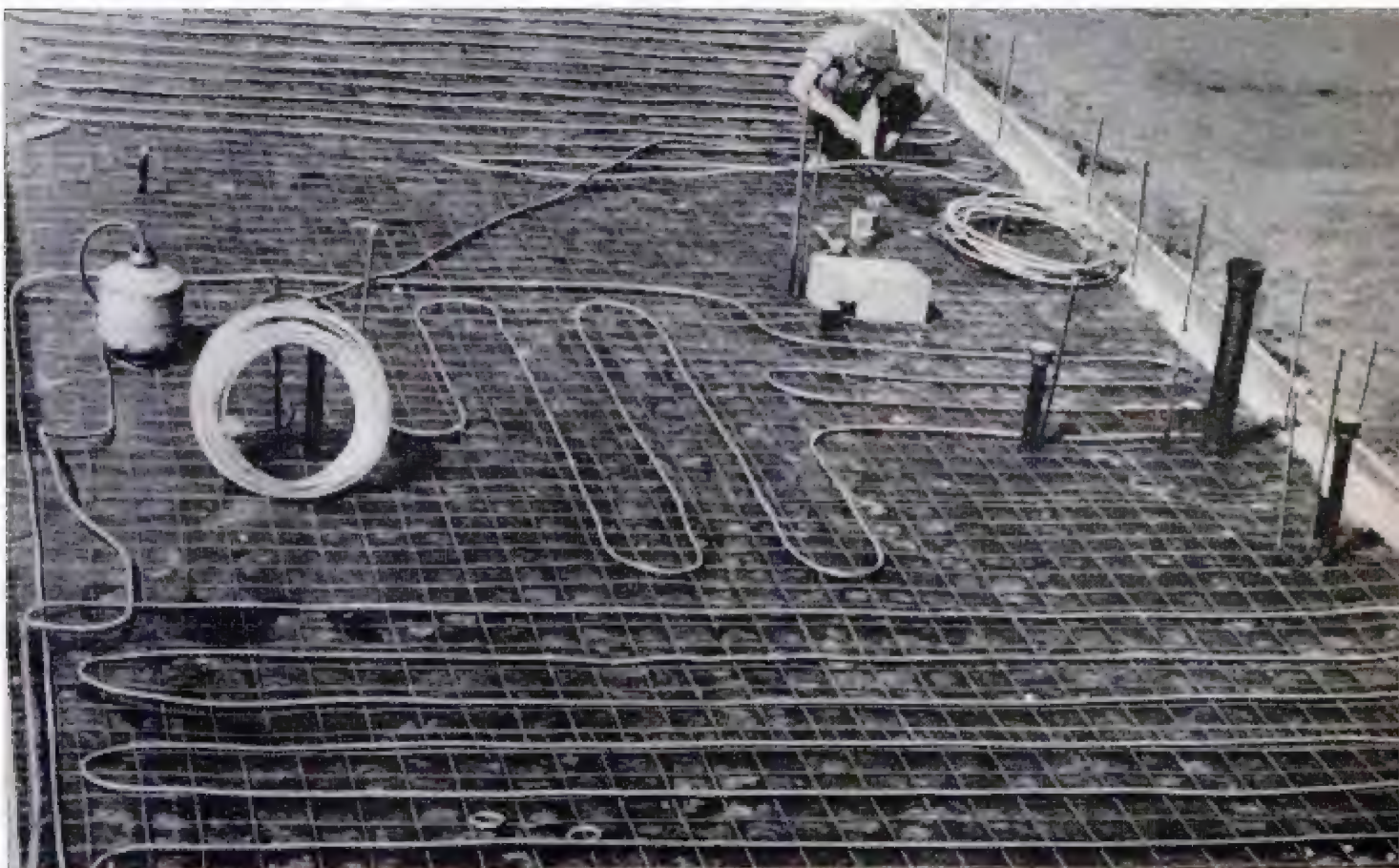
Another built-in innovation is the bookcase-desk-dining-table unit. Table top was made from flush-type door

The house I built adjoins our old home and provides an excellent duplex arrangement. The new section, a complete unit in itself, has a concrete-slab foundation with over-all dimensions of 18 by 40 feet. It consists of living room with dinette in one corner, bedroom, kitchen, bathroom and cen-

ter hall. The exterior is of lightweight building blocks which were easy to handle and have high insulating qualities. The radiant-heating unit is operated by a booster-type hot-water heater and pump.

Building your own home is a wonderful chance to give free play to the imagination

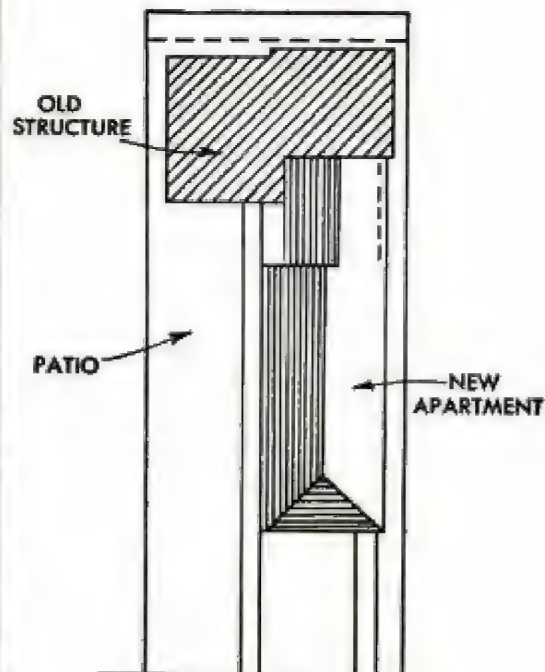
Radiant-heating installation in the floor consists of half-inch copper tubing tied to reinforcing steel wire





Waggoner designed and built this collapsible "office" which holds typewriter and filing cabinets. Lid on top of drawer is raised to support top in open position. It's made of plywood

Table top which opens from bookcase (also shown on page 147) can be used as desk as well as for dining. Waggoner uses the space just above it for storing kitchen items, such as toaster



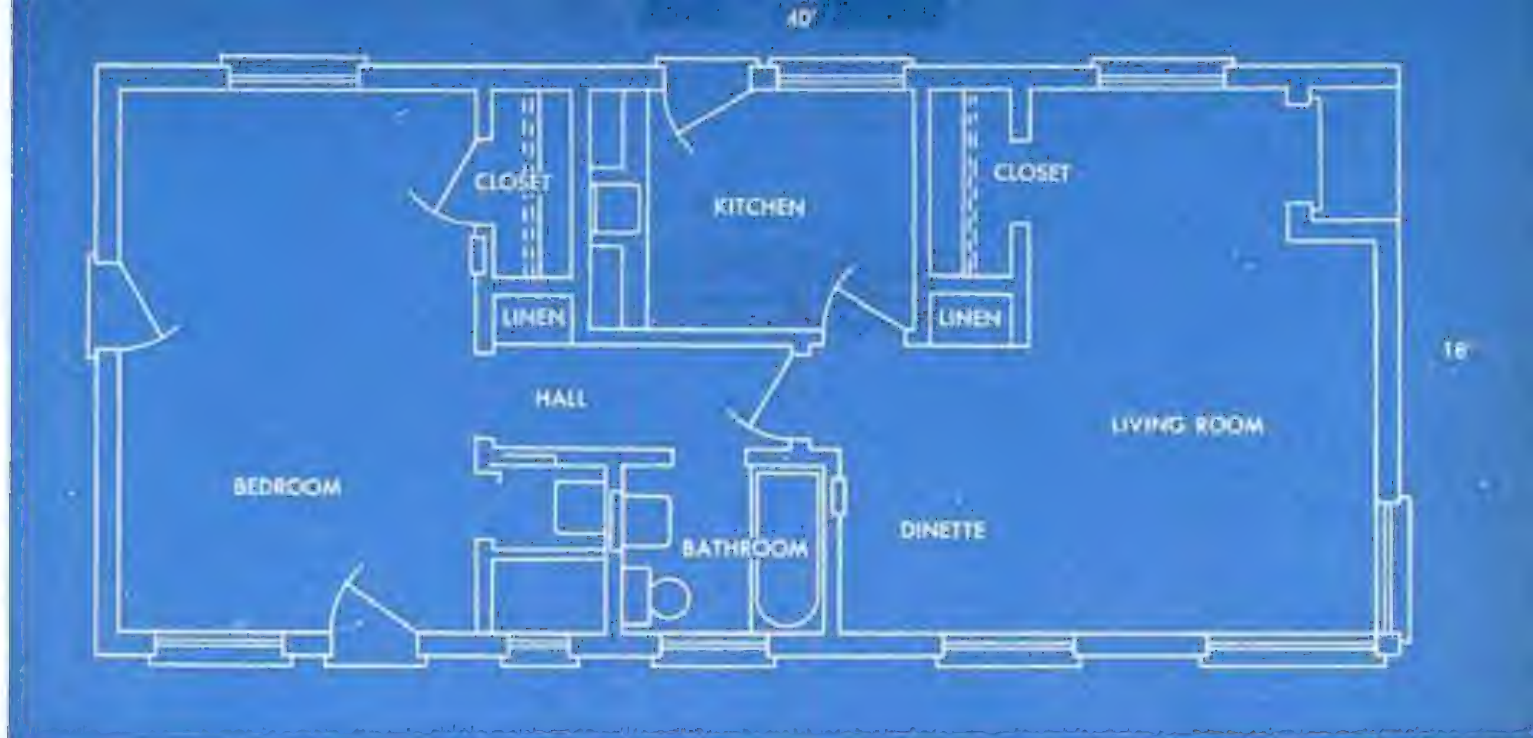
Sketch shows how new apartment, actually complete house, was added to old home

—especially in regard to various built-in items. Refinements such as radiant heating, foil insulation, mercury light switches, flush overhead lighting, magnetic and touch latches on cabinets can be had by anyone with the price. Builder's brain storms that result in innovations pertaining to built-ins and timesaving gadgets are another matter.

I'm proud of my double closets with sliding doors on a single overhead track with a built-in chest of drawers between. These sliding doors activate a light switch of my own design — a bed caster on the end of a stick operates the refrigerator-type switch. The closet lights up when either of the doors is opened beyond the halfway mark.

Then there's my combination bookcase, storage compartment and drop-leaf table. The table is built from a section of a flush-type door. It is supported without legs and folds flush into the bookcase. The leftover part of the door now serves as the top of a corner table which can be moved over to form an extension for the table.

I built a clothesbin into a wall with a de luxe feature—a concealed compressed-air doorstop that prevents slamming. My kitchen-cabinet doors slide instead of swing open. To make the sink cabinet I used a single piece of plywood for the front and cut out the doors with a portable electric



Waggoner's one-bedroom floor plan provides plenty of closet and storage space. His specialty is built-ins

saw. Then I hinged them back into the same openings with piano hinges. Cutting the doors in this manner, they had to fit.

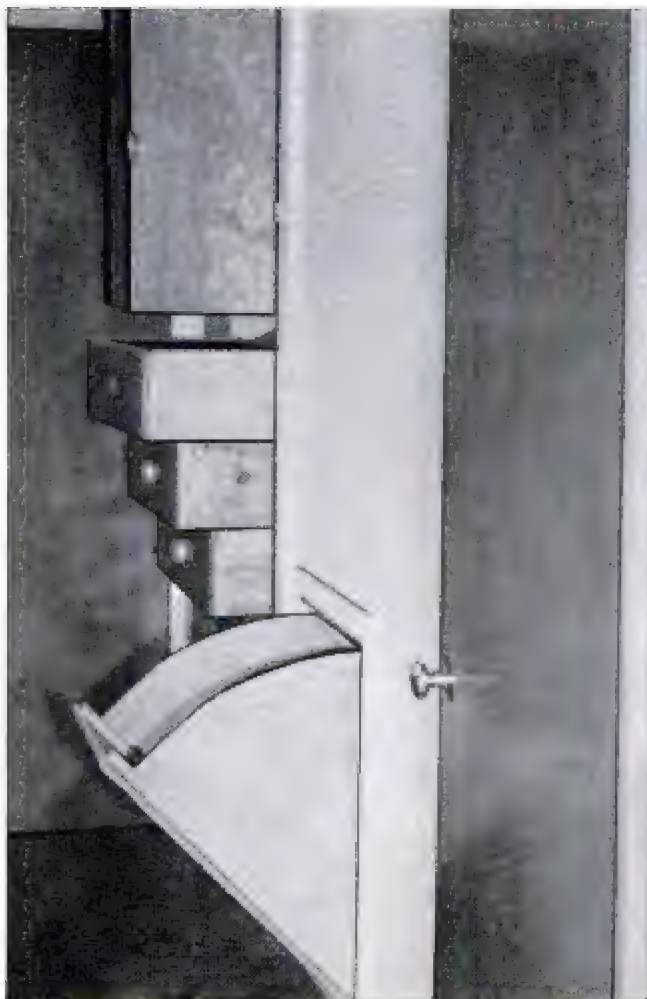
My favorite kitchen gadget is the clock made from an old electric timepiece. I took everything away from this clock but the works and the silhouette hour, minute and

sweep-second hands. Now I have a clock with nothing but hands on the kitchen wall, with ornamental thumbtacks as the hour markers.

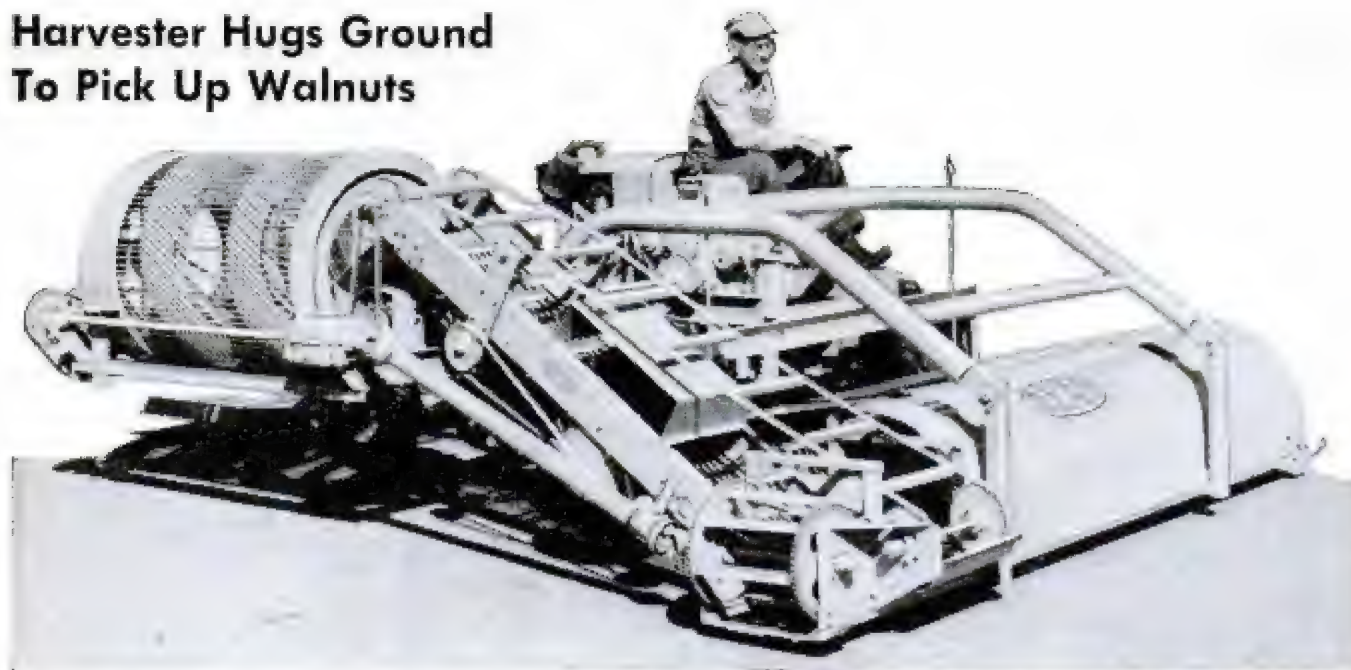
Now that the house is complete I have lost some of my awe for the Pentagon building. ★ ★ ★

Built-in chest of drawers with linen closet above and a clothesbin below occupies wall space in hall

Double clothes closet trimmed in combed plywood has light which turns on when sliding doors are opened



Harvester Hugs Ground To Pick Up Walnuts



Self-propelled machine picks about an acre of walnuts per hour. Right, picking fingers scoop up nuts

Walnuts are scooped from the ground with a minimum of dirt and leaves by a new self-propelled harvester. The machine hugs the ground, its picking fingers following the contours to harvest all the nuts without digging into the soil. The whirling fingers toss the nuts into a conveyor which moves them to a grated elevator where a fan blast eliminates most of the leaves and dirt. The nuts then move into a double "squirrel cage" for a final cleaning and are raised by spiral elevator for sacking or delivering to the trailer. The harvester has two gasoline engines, one to provide motive power and the other to operate the harvesting apparatus. Thus the harvesting-unit speed is constant regardless of the ground speed of the vehicle.



Global Air-Race Game Teaches Players Geography With Recreation



Geography is combined with recreation in a game which uses a globe of the world as a playing board. The game using an eight-inch metallic world globe, play money and play gasoline, magnetic planes and a propeller at the base of the globe, enables two, three or four players to "fly around" the world over a red-dotted route from airport to airport. The players spin the four-bladed propeller, which entitles them to chance cards. The cards advance or penalize the players, and the first one to make a trip back to the original airport wins the game. The globe is printed in seven colors and carries over 2500 place names.



Faucet is mounted within easy reach of driver. Water is heated by passage over hot manifold of the engine

Water Tank Atop Truck Engine Supplies Cab With Hot Water

Ray Justice of North Hollywood, Calif., likes a cup of coffee. He likes it so well, in fact, that he installed a hot-water faucet below his truck dashboard in order that he might make instant coffee whenever he

wishes. A stainless-steel tank atop the engine connects to a coil which winds around the hot manifold before it reaches the cab spigot. A few minutes of running time assures piping-hot water.

Perforated Sport-Car Chassis

Formed of strong steel tubing welded and perforated with thousands of holes to reduce its weight, the chassis of the Borgward sports racer is rugged as well as light. The radiator core is mounted very low and forward and has an oil cooler on one side. The differential is mounted on the chassis frame, as in the German Mercedes, and power is transmitted by two drive-shafts, each shaft having two universal joints and a slip joint. A light but rigid axle connects the wheels to keep them parallel at all times. Radius rods and torque arms are also included in the suspension system. While the engine is only about 40 percent as large as that in a Chevrolet, it is expected to drive the car at more than 100 miles per hour. The body is of hammered aluminum.



Hammered-aluminum body rests on steel frame perforated for lightness





Drawing shows how Denmark's two-level bridge would dip under island of Sprogø to allow for ship canal



Giant Bridge to Dip Under

By Kai Norredam

A BRIDGE is being planned in Scandinavia which will be one of the most unusual in the world. Connecting the two main islands of Denmark, Fyn and Sjaelland, it will be eight to ten miles in length and at one point will dip under an island.

The idea of building a bridge of unknown dimensions between Fyn and Sjaelland has long fascinated Danish authorities. The bridge will not only be unique in design, but will require more money and more material

than any other bridge in the world. In order to reach the Atlantic Ocean, the heavy ships from the Baltic Sea will have to pass through the eastern waters to be spanned by the bridge. As this is the only way of access, it is expected that the other Baltic powers will claim their right to free passage for their ships.

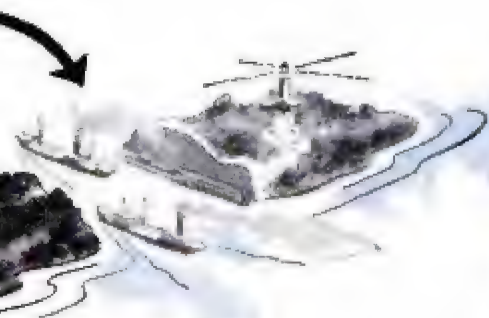
During the last 20 years, many plans have been made. The most interesting of these plans has an ingenious solution to the ship-

passage problem. From Korsør (harbor of Sjaelland) a bridge would be built to the small island of Sprogø which is about half way to Fyn. Half a mile off shore the bridge will dip into the sea, continuing as a tunnel which passes beneath Sprogø in an east-west direction. The tunnel will emerge on the other side and continue as a bridge to Fyn. At a right angle to the tun-



Map shows location of long bridge needed between the islands of Fyn and Sjaelland with tiny Sprogø half way

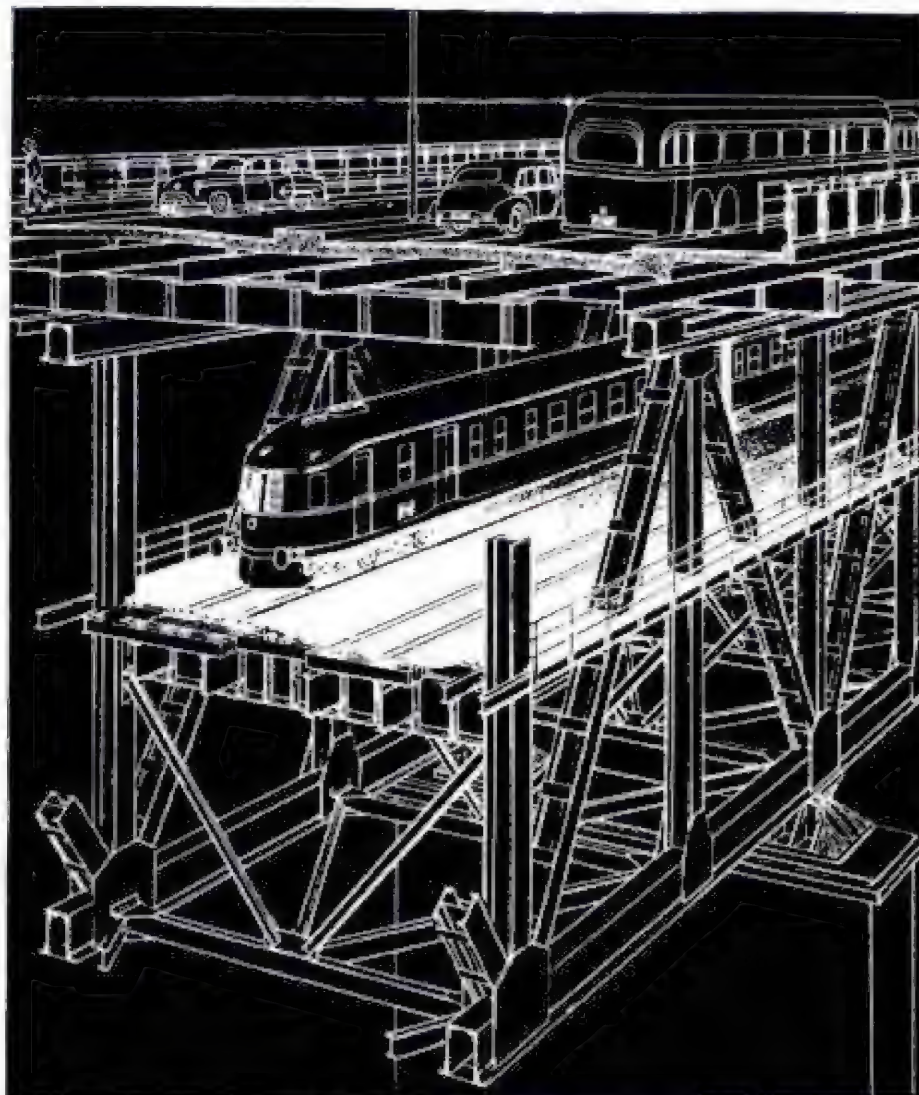
Headache to Danish engineers is the necessity for providing passage for ships between the islands connected by bridge. One solution is island canal



Island

nel, a canal would bisect the small island from south to north. The canal would have a width of 900 feet and be 130 feet deep, permitting passage of the biggest ships. The canal would be superimposed on the tunnel, its bottom separated from traffic going through the tunnel by a few feet of clay and concrete.

The most difficult part of constructing the bridge would be the mounting of supporting pillars. This will probably be done with the aid of ship caissons. These are huge (weighing up to 10,000 tons) iron and concrete "bathtubs." These are built on shore and launched like ships. The floating caisson will be conveyed to its place and tipped 180 degrees by means of letting sea water into some of its surrounding hollow tubes. The open end of the



Drawing above shows how the two-level bridge would accommodate two lanes of automotive traffic on the upper level with sidewalks for pedestrians. The lower level has two railroad tracks. Below, another Danish project, the Little Belt Bridge which now connects the island of Fyn with Jutland

Monberg & Thorsen photo, Copenhagen





Monberg & Thorsen photo, Copenhagen

The proposed new Danish bridge will dwarf the Bridge of the Great Stream which is located in south Denmark

caisson will steady itself against the sea bottom. The closed end of the caisson, reaching some feet above sea level, will serve as an excellent foundation for the pillar. Down through the iron tubes, holes will be bored several feet deep into the clay of the sea bottom. The tubes and their corresponding holes are then filled with concrete. To steady the pillar further, the sea water is sucked out of the caisson, leaving the pressure of the surrounding water to keep it in place. When the pillars are built, the superstructure will be mounted in 268 sections built on shore.

The bridge is to be built with two levels, the upper level containing two lanes for cars, each 21 feet wide, and two seven-foot pavements. The lower level of the struc-

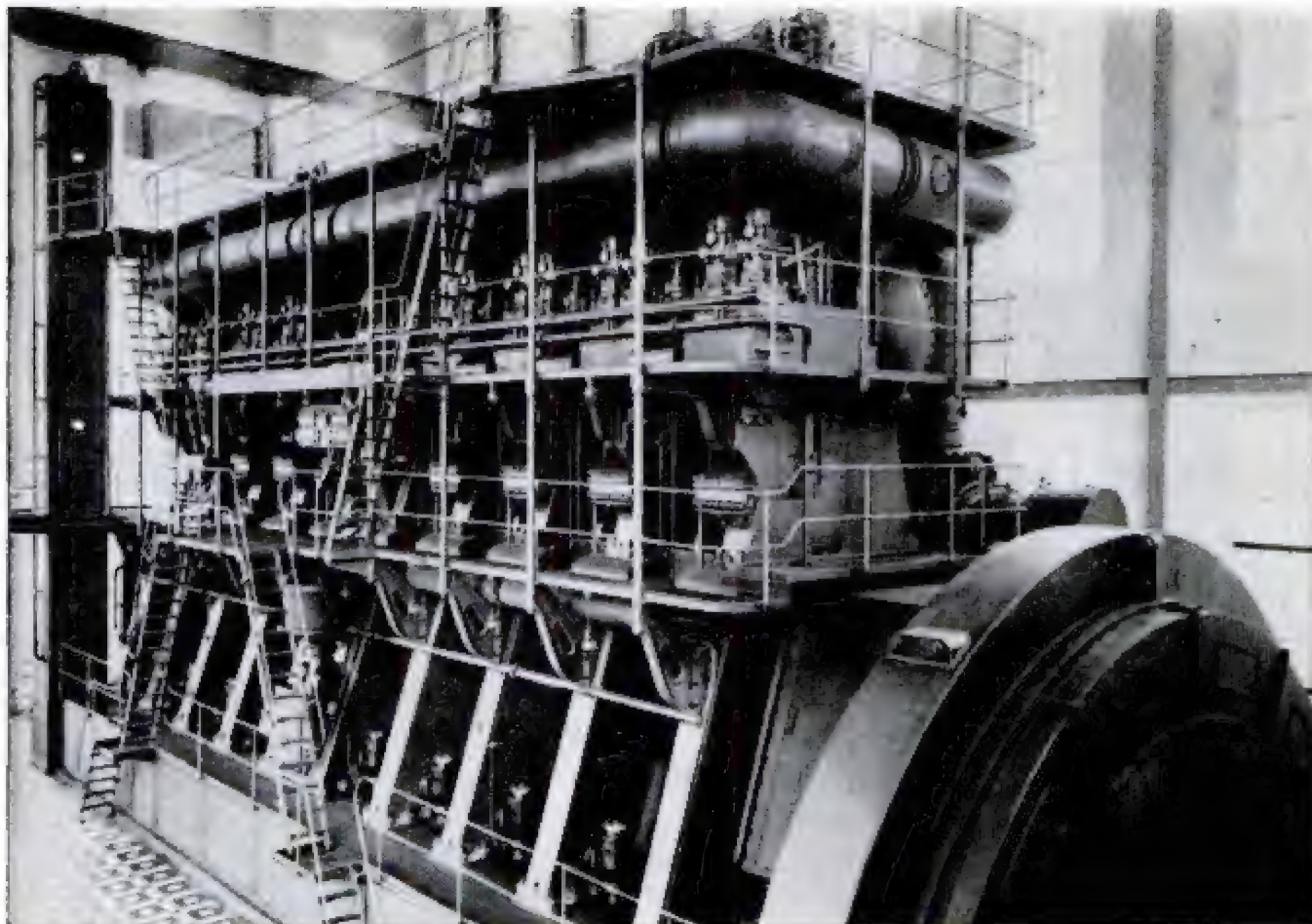
ture is designed to hold two railroad tracks.

A second plan provides for a bridge in one piece with a length of about 12 miles, connecting Fyn and Sjaelland directly. The eastern part of the bridge would rise to a height of 200 feet above the surface of the water to allow for the passage of big ships. The tallest of its 269 supporting pillars would be 360 feet high. This would also be a two-level bridge. The cost of either bridge is estimated at \$500,000,000.

In a country surrounded by water and islands, Danish engineers have become experts in the art of bridge building. Two outstanding examples are the Little Belt Bridge, which connects Fyn with Jutland in the southern part of the country and the Bridge of the Great Stream. ★ ★ ★

Caisson to support bridge pillar is launched like a ship and then towed to the site. It weighs 10,000 tons





Massive Diesel Engine Generates Electricity

One of the largest diesel motors in the world generates electricity for the city of Copenhagen. Thirty-eight feet high and 80 feet long, the massive generating unit turns out a maximum of 15,000 kilowatts. Fuel oil for the engine is supplied from a near-by reservoir. The huge unit is completely self-contained and the motor is independent of electric current; should a serious mishap

occur, causing the regular power supply to be cut off, the engine could be started in a few minutes. The water cooling system is designed so waste heat may be used to warm buildings located within a mile of the generator. After this, the heated water would be piped underneath the streets and returned to the cooling system cold enough for reuse.

Mechanic's Tool Tray Hooks Onto Radiator for Convenience

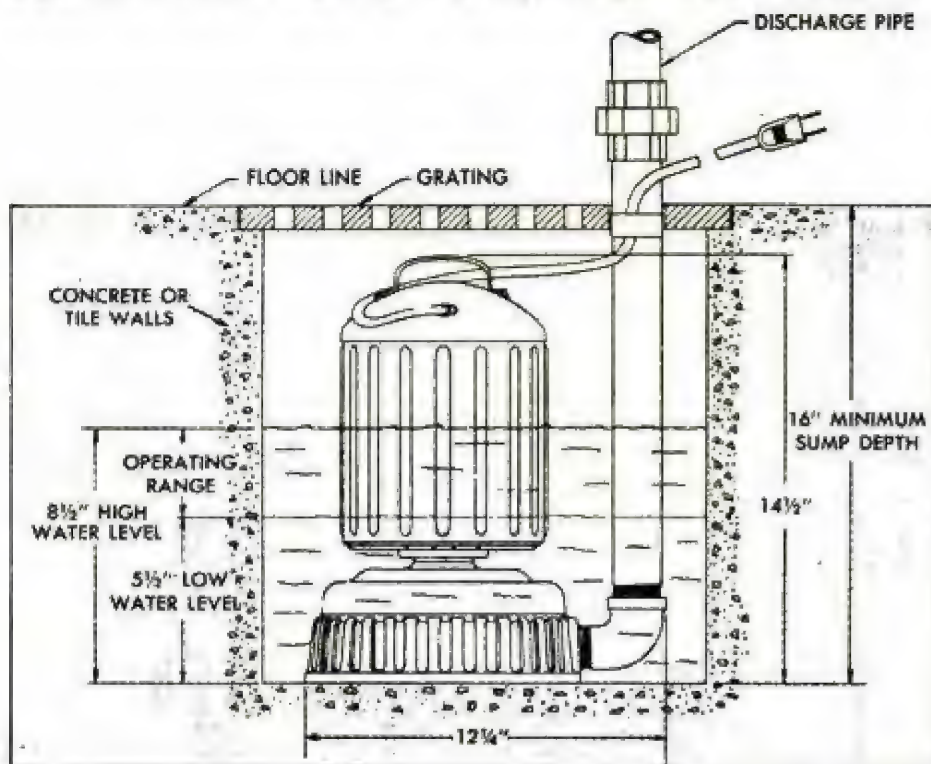
Saving time on automobile repairs, a mechanic's tray keeps repair tools close at hand. The 14 by 20-inch holder hooks over the radiator and an adjustable rod keeps it level. The tray fits all 1945 or later model cars and folds for compact storage.



Panama Canal Has Big Year

More shipping passed through the Panama Canal during 1952 than in any previous year. The total number of seagoing merchant ships passing through the canal for the first 11 months exceeded by 562 the total for the full 1951 calendar year. By year's end, the total exceeded 7000 ships.

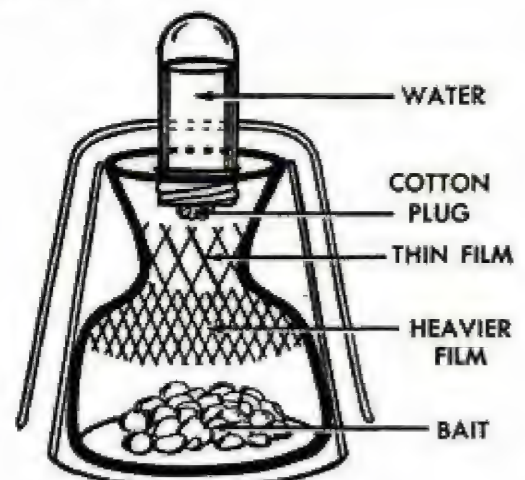
Submersible Sump Pump Has No Floats Above Floor Level



Installed simply by placing it in the basement drainage pit, connecting the discharge piping and plugging in the electric cord, a submersible sump pump is completely below floor level and mounts no protruding floats or rods. Motor and operating switch are enclosed in a stainless-steel housing which keeps electrical parts clean and dry. The housing also functions as a float to control pump operation and protects working parts from water if power fails and the unit is submerged. The pump's operating range is set at the factory.

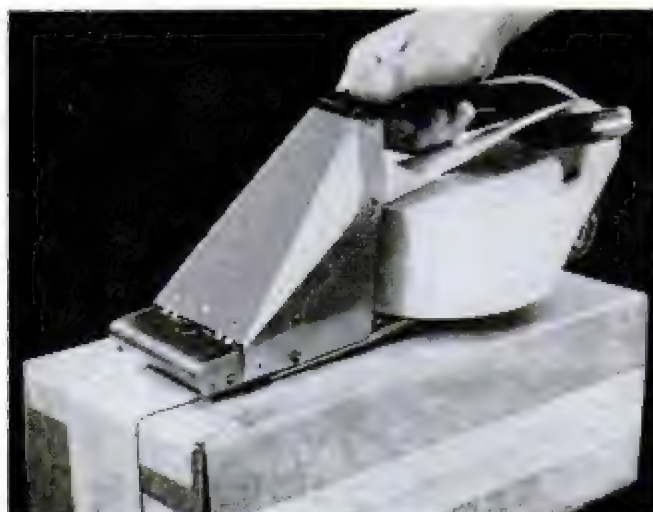
"Flowerpot" Trap Lures Insects and Humidifies Air

Roaches, ants, silverfish and other insects are captured by a trap which looks like a flowerpot turned upside down. An outer shell hides the essential part of the trap—a wide-mouth, narrow-neck bottle which contains the bait. Bugs crawl up its netting sides, over the lip and down the inside, but cannot escape because of a slippery smear band within the jar. An inverted bottle on top of the trap feeds water to a cotton wick which humidifies the air, facilitating dispersion of the bait odor. The captured



insects are killed by filling the trap with hot water.

Portable Tape Dispenser Facilitates Sealing of Shipping Cartons



Weighing only 2½ pounds, a portable tape dispenser eliminates moving large shipping containers to a centrally located tape machine. It applies the tape directly to the carton. The moistening tank won't leak even when the unit is turned upside down. The dispenser accommodates 600-foot rolls of gummed or filament tape up to three inches wide.

Three tropical woods have been found that are immune to the ravages of ship worms and therefore could be used to advantage in the construction of dock pilings and small boats.

Cockpit Capsule Allows Pilot to Escape High-Speed Plane



Douglas Aircraft Company sketch

Bottled rocket energy may be used to shoot the cockpit from the fuselage and permit emergency escape from the 2000-mile-per-hour, stratosphere-flying aircraft of the future. A design proposed by A. M. Mayo, an engineer of the Douglas Aircraft Company, provides for a sealed cockpit capsule that could parachute down slowly and land safely on land. If the capsule, which is actually the forward section of the plane, should come down on water, it would float until the pilot emerged.

Concrete Slabs Bend Like Steel When Reinforced With Steel Wire

Reinforced with slender steel wires stretched to about two thirds their ultimate strength, thin slabs of concrete have tremendous elasticity. Slabs are made from $\frac{1}{2}$ to 1 inch thick and in four-foot widths. Any length up to 20 feet is available. Larger sizes can be made up to 8 feet in width and 40 feet in length. After the concrete has set, the tension in the wire puts the concrete under high compression in both directions. This compression prevents water absorption and permits rough handling without damage. If the slab is overloaded it will bend to a quarter circle and straighten itself out when the load is removed.



Television sets in the nation's homes numbered nearly 21,000,000 January 1, according to R.C.A.



Offset Gun Sight Leads Birds in Flight

Hunters using a new offset gun sight automatically lead game birds so the shot intercepts the line of flight. The sight is a spring-steel framework that snaps on or off the gun barrel. If the bird approaches from the left, the sportsman sights along the bar extending to the left of the barrel. He uses the right sight bar for birds approaching from the opposite direction. Thus the gun barrel automatically is aimed slightly off the direct line of sight to compensate for the time lapse of the hunter's reaction and the travel of the shot while the bird is in flight.



WHAT'S NEW FOR Your Home



1



1. CHANGEABLE CHAIR for children from four months to four years old serves variety of needs. Minus the adjustable tray, it's a play chair. Attachment of tray to one arm adapts it to TV viewing. With legs removed, it converts a standard chair into a high chair, also serves as auto seat

2. HOMEOWNER'S RECORD book shows just where the money's going, contains 18 sections with space for every expense from monthly payments to taxes to repairs. Kept up to date, the book gives a clear and continuous picture of expenditures and improvements, helps locate information quickly



2

3. ALL-PURPOSE KNIFE is a carving knife, bone and food saw, and a serving fork. Fine saw teeth cut easily through bone and frozen food. Knife edge can slice meat and vegetables wafer-thin. After meat is carved, it can be transferred to plate with forklike front prongs

4. HANGER for appliance cords is made of bright-colored china, hangs on kitchen or closet wall. Five curved grooves hold the cords in a position which prevents kinking of the cords or the breaking of the tiny copper wires inside. Cords are thus kept neatly within easy reaching distance



3



4



5

5. BABY BOTTLE with built-in thermometer prevents the serving of milk that's too hot or too cold, also indicates if a half-full bottle needs to be reheated. It is made in Germany



6

6. SINK features small side well with separate drain. Perforated waste receptacle holds scraps and garbage, may be removed from well for washing and rinsing fruits and vegetables

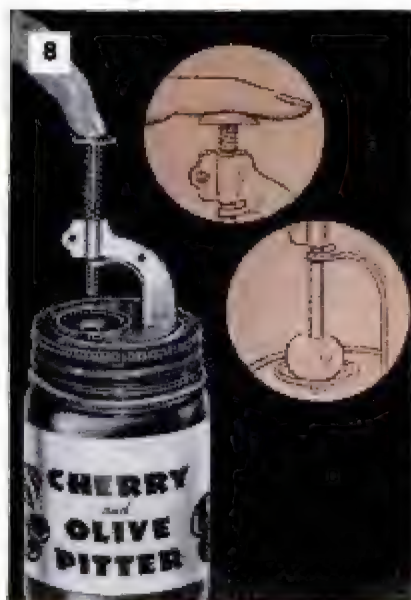
7. SAFETY KNOB for ranges can't be turned on accidentally, must be pressed in firmly enough to resist a spring and engage tiny notches of the outer portion with those of inner disk



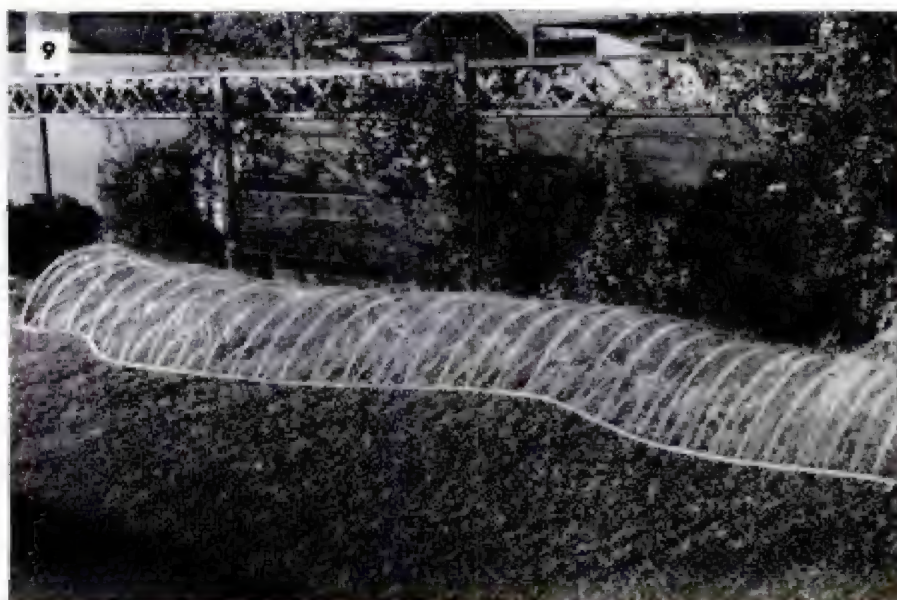
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8. PITTER for cherries and olives forms the lid of a pint Mason jar into which pits fall. Cherry or olive rests in concave dish with hole in bottom. Plunger rod pushes pit through hole

9. FLEXIBLE SPRINKLER made of plastic can be draped or twined around flower beds or lawns. A 50-foot length, which weighs only one pound, sprays an area 12 feet wide and 50 feet long



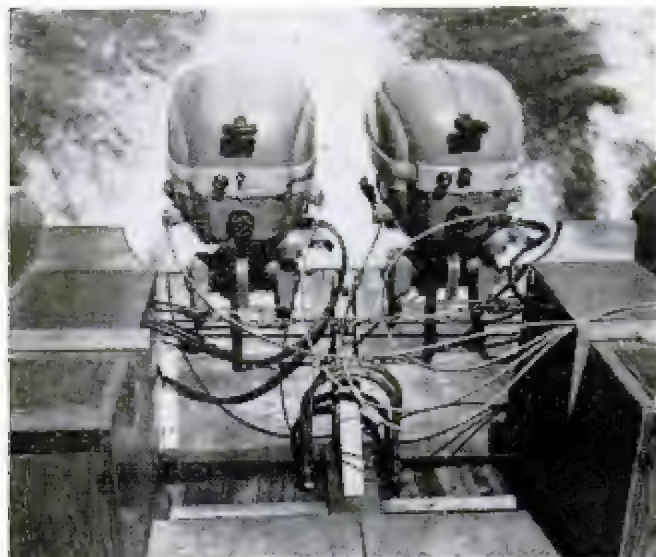
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9



Ewald bought the hull and built the cabin of his boat himself. Boats on facing page are commercially built



Above, remote controls enable the pilot to sit up front as on inboard cruisers. These motors put out a combined 50 horsepower. Below, Mrs. Ewald at the wheel. The base of the seat contains extra gas tank



Twin Outboard Motors Power "Poor Man's" Yacht

SOMETHING has happened to the yacht-club set—it has been invaded by the outboard motor. Cabin cruisers, once too high-priced for the average man, are now cheaper than the family car.

Responsible for the change are compact, high-riding and usually broad-beamed boats known as outboard cruisers. You'll see them on rivers, lakes and oceans this year in amazing numbers. A few years ago they were used for day sailing or overnight fishing trips only. Today 1500-mile voyages are not uncommon.

A veteran in the field is Harris Ewald of Milwaukee, Wis., whose interest is both professional and recreational. He is chief engineer for Evinrude Motors.

Ewald mounts two 25-horsepower motors behind his 18-foot cruiser and skims along Lake Michigan at 30 miles per hour. He and his wife travel as much as 1200 miles a season on week-end cruises alone. They've made extended trips of several weeks in the boat. Similar boats have sailed the inland waterway from Florida to New York in safety and comfort.

Advantages of the outboard cruiser are many. Economy is the biggest, of course. The Ewald boat cost less than \$1500, complete with motors (he bought the hull and finished the cabin himself). You can buy a complete boat, a semiassembled boat or a kit of precut parts. A top-grade cruiser can be put into the water for about \$1800 complete with motor—less if you do the work yourself. ★ ★ ★



Featured at the '53 Boat Show

More than a dozen companies sell outboard cruisers in varying stages of assembly from a full kit to a complete boat. These were among those shown at the National Motor Boat Show. Top left, out of the way under the rear deck is the motor on an 18-foot boat

Top right, three's no crowd in the cockpit of a 21-footer, sold as a kit. Center, it may not look like it, but there is an outboard in a well in the cockpit. Remote steering and motor controls are used on all models. Below, an all-aluminum outboard cruiser





Though most of his work is done by hand, Works uses a bandsaw to shape a graceful leg for a coffee table

“Antiques” From a Modern

By Walter E. Burton

Precise jig helps Works saw duplicate parts quickly and accurately without stopping to measure them



IN A FORMER schoolhouse at Five Forks, Va., cabinet woods are transformed into beautiful works of art. Here Donald C. Works fashions mahogany tea caddies and trays, cherry mirrors and other articles which are duplicates of antiques 200 years old.

The reproductions from Works' workshop are not merely made to look like the originals; they are faithful copies of materials, joints, splines, shapes and sizes. Although he uses such modern aids as power tools and jigs for shaping many of the duplicate parts, each piece is essentially a hand-made reproduction.

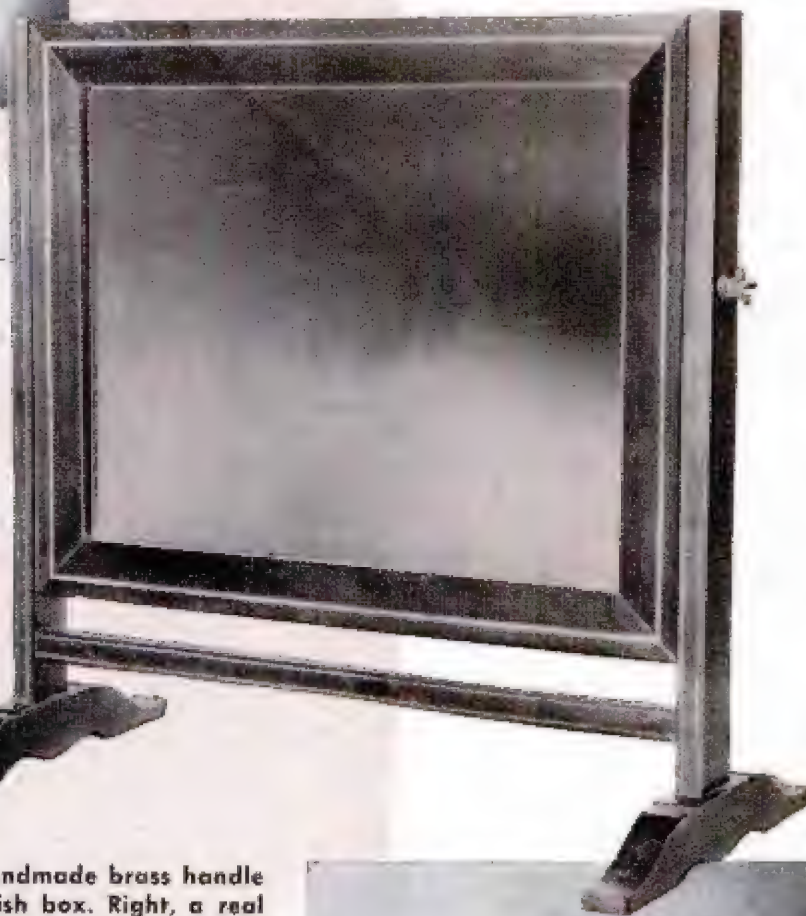
In the 18th century, when the originals were made, cabinetmakers and woodworkers, unhurried by the demands of modern mass production, were real craftsmen. Their art is fading. Works has been unable to find many persons capable of duplicating the craftsmanship of the 18th century. He has been assisted at most by two employees



Base and stem of hurricane candleholder are connected by a threaded wood joint. It's tight but comes apart easily



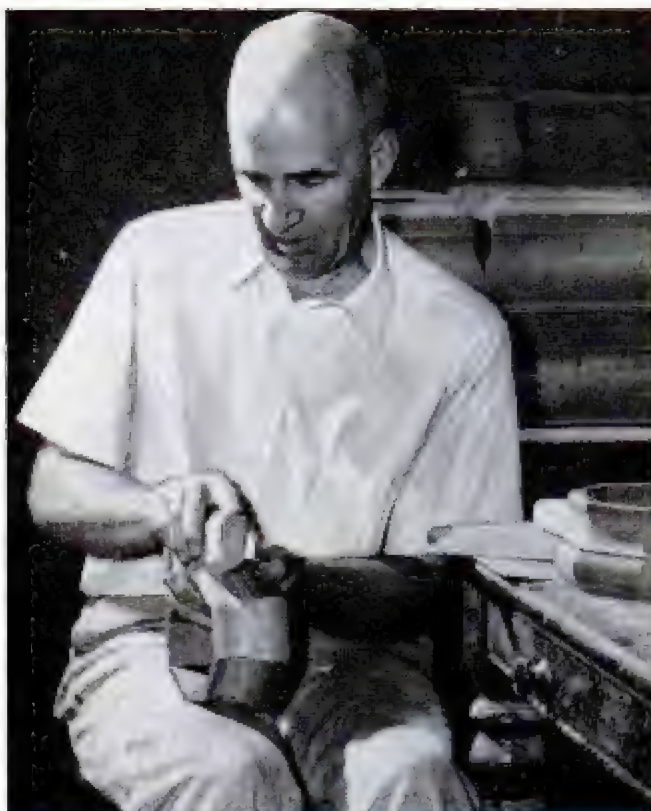
Works patterned this mahogany tea caddy after an original made in England about 1760. Parts are joined exactly the same way. Caddy now holds cigarettes. Below is one of his shaving mirrors



Shop

Below, another caddy has a handmade brass handle and lock like the original English box. Right, a real work of art is tray carved from single piece of wood





Craftsman does all the sanding by hand. In some cases he stains and finishes parts before assembling them

in trying to keep up with the flow of orders.

His home is evidence of his own unhurried work; it contains tables, desks and many wooden furnishings which look as if they had come directly from an 18th-century cabinet shop or from the colonial section of a museum. All were made by their owner.

Another reason for the high standard of craftsmanship in the products of the schoolhouse-shop is that they are made for the Reproduction Program of Colonial Williamsburg and must meet the rigid requirements of the crafts advisory committee which has charge of all craftwork sales at the restored first capital of Virginia.

Works is a middle-aged ex-Navy man. While attending the United States Naval

Spline joint, ready for the glue, is neat and strong



Academy he gained renown as a boxer, and at one time represented the United States in the Olympic games. He left naval service to go into business for himself. During World War II he re-entered the Navy and for a while was stationed at Camp Peary near Williamsburg. He liked that section of the country so well that when he again left the service, he and Mrs. Works made Virginia their home.

For many years cabinetmaking had been his chief hobby. When he acquired the old schoolhouse and near-by residence it was natural that he should convert the school building into a workshop. Eventually representatives of the Williamsburg Reproduction Program heard about his fine cabinetwork and entered into an agreement with him for the production of craft articles.

Works has developed a number of short cuts that help considerably in the production of duplicate articles. But he believes that construction features which have enabled wooden articles to survive in sound condition for 200 years and more are worth using today. Picking up a small mahogany tray he points to the splined-and-mitered corner joints in the sloping side pieces.

"See those splines?" he says. "The mahogany pieces in this tray are only $\frac{1}{8}$ inch thick, just as they were in the original. The corners of the original are still sound after 200 years, thanks to the splines in them. So I put the same kind of splines in my trays, and expect that they will hold together that long." The splines are thin strips of wood glued in saw cuts.

Works uses hot glue for assembling his wooden reproductions on the theory that an adhesive capable of doing its job over a couple of centuries is still worth employing.

For cutting duplicate parts he has developed a series of jigs that fit his circular saw and other tools. Whenever he wants to cut some segments of mahogany molding to form the sides of the octagonal tea caddy (a small box for holding tea), he merely selects the proper jig and mounts it on his saw table. He does not have to do any measuring or make critical adjustments, for such details are handled automatically by the jigs.

Another trick he employs is to finish the inside surfaces of tea caddies, boxes and similar articles before he cuts and assembles them. This is much easier than applying lacquer or paint to inside surfaces of finished articles.

For most of his products he uses mahogany, usually from Brazil. Stock for the tea caddies is first milled, like molding, to the proper curved contours. After the parts are assembled all surfaces are carefully hand-sanded. The caddies are lined with lead foil,

(Continued to page 250)



Remote-Control Automatic Camera Inspects German Sewers

When German officials want to inspect the inside of underground drainpipes, they do it remotely with an automatic camera. The camera is sealed inside a housing mounted on a small sled. Four lights illuminate the walls of the pipe so defects can be spotted on the photographs. To take a

picture, the operator simply presses a button on a hand-held control box. If necessary, he can take six exposures per second. The camera has a capacity of 48 exposures before it has to be reloaded. The sled is pulled by a cable and will pass through pipelines only 10 inches in diameter.

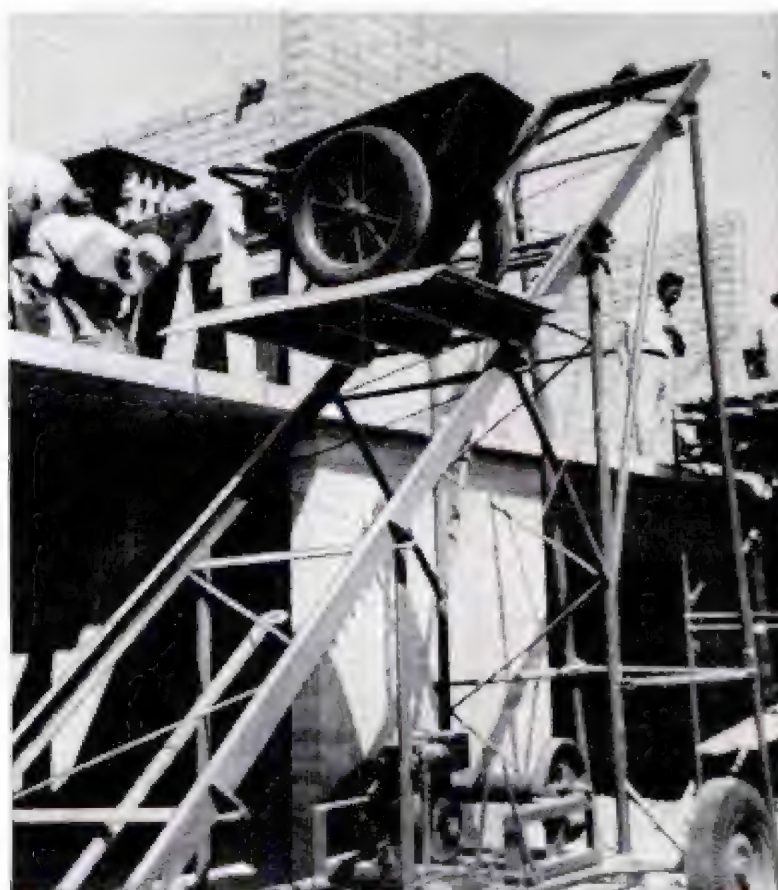
Television Goes to Work for Sugar Plantations

Two Hawaiian sugar plantations will soon install closed-circuit TV systems in their cane mills to give technicians a constant view of the cane as it moves from cleaning plant to grinders. Mounted at a strategic point above the conveyor in each

plant, its lens shielded from dirt and spray, the camera would transmit a picture via coaxial cable to the control center. Efficient mill operations require that the cane be moved by the mechanical conveyors at the right speed and in proper quantities.

Wheelbarrow Elevator Aids Construction

Time is saved and costs are cut at a Honolulu building project by the use of a slanting elevator which hoists concrete barrows and building materials to upper floors. A small one-cylinder motor turns a winch which draws the materials platform up an inclined track. Able to lift 3000 pounds, the apparatus is loaded and controlled by one man instead of the three needed to operate a block and tackle. Equipped with pneumatic tires, it can be moved with a minimum of effort.



Sources of available products described in this issue are indexed on pages 12, 14 and 16. Sources of further information on other articles are listed in the WHERE-TO-FIND-IT LIST, which is available to readers from Bureau of Information, *Popular Mechanics Magazine*, 200 East Ontario Street, Chicago 11

Low-Cost Home on the Range

By Kate Gibbs



Made of cinder block, this Oregon "special" will eventually provide two granaries as well as a machine shed

FOR THE MAN who wants a quick, low-cost home on rural acres or town lot, the "Agency Plains Special" developed out in Oregon holds convertible possibilities.

Primarily, the "special" is designed to provide the farmer with a temporary home, plus machine shed. Later it can be converted to all shed, or part shed and part granary. But the special has been intriguing the city man, too, with its possibilities for providing both low-cost home and garage—either permanent or temporary. If built on the back of a lot, the unit can become a ga-

rage and workshop when a new home is constructed on the front of the lot.

The special is something that just sort of grew up after World War II on the Agency Plains of the Bureau of Reclamation's Deschutes irrigation project in Oregon. When water was brought to abandoned wheat land, many new farms appeared.

"That meant new homes and farm buildings were needed in a hurry and at low cost," explained Merle L. Tillery of the Bureau of Reclamation. "The special was the natural answer."

Knotty pine such as this furnishes an attractive interior finish for \$2000 to \$3000 convertible buildings





Filled-in doors indicate the owner plans future use of the living quarters as a double garage. Drop siding is a popular material and most of the Deschutes project's roofs are of corrugated aluminum

The average building that sprang up on the project was 80 by 24 feet, with a 24-foot square devoted to living quarters. These quarters were usually designed to provide two bedrooms, living room, kitchen and bathroom. Not big rooms, but very livable.

The first specials constructed cost only about \$2000. Then two things happened: Cost of materials and labor went up, and folks got to adding a few de luxe features. Now the cost of an 80-foot-wide unit usually runs above \$3000. The price tapers down for smaller units such as the city man would construct.

Oddly enough, the open or shed part of the building adds interest to what is otherwise a very simple design. This, and low cost, appeals especially to the city man.

The farmer is primarily concerned with having a place for his equipment as well as for his family. As many units as needed can be added to take care of the equipment

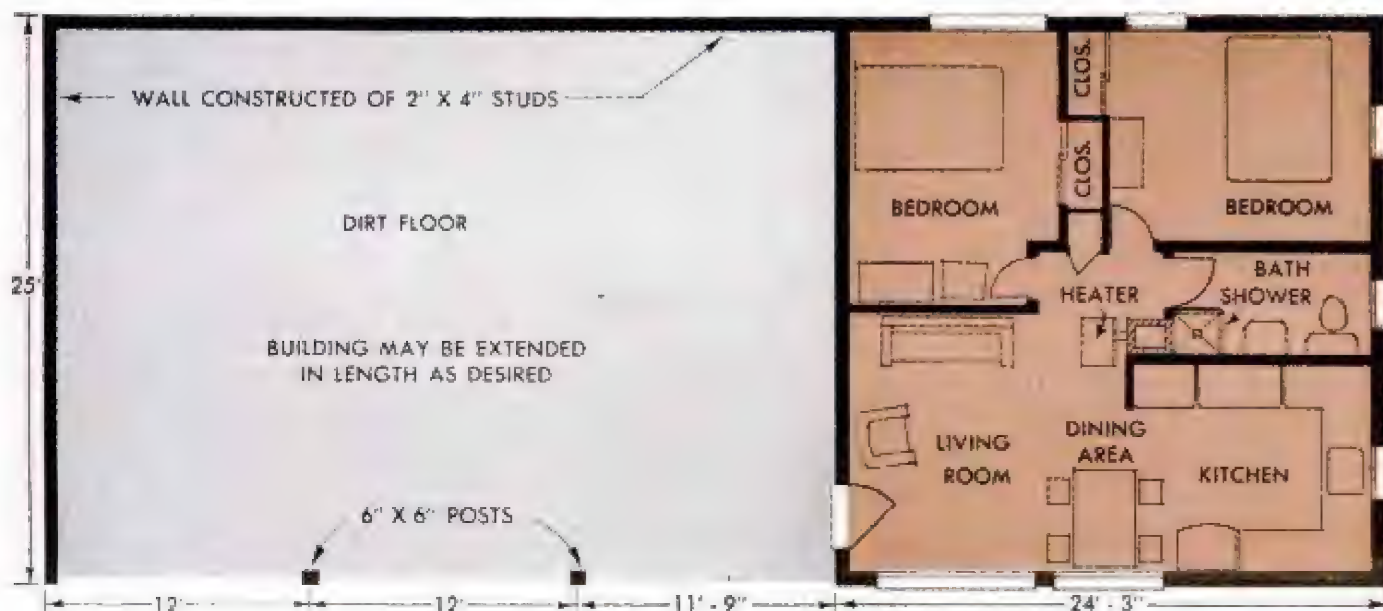
and provide feed storage. Some farmers have built living quarters on one end and a granary on the other, with machine shed in the center.

The Deschutes farmers have been pretty well divided on the use of drop siding and cinder blocks. The most popular roofs are those of corrugated aluminum. Interior walls of living quarters run from plaster-board to knotty pine.

"The quality of the finishing should depend on the number of years anticipated for use of the living quarters as such," said Tillery. "The tendency is to overdo the living quarters, even though they are intended to be only temporary."

Some living quarters have been completely insulated, and have an air of permanence. In others, however, what will later be garage-door openings have even been cut out, then filled with siding which can be taken off easily. ★ ★ ★

Most plans call for four main rooms within the approximately 24-foot-square living area of a special





Retracted roof panels transform living room into a sunny, open-air patio. Single electric motor does the work

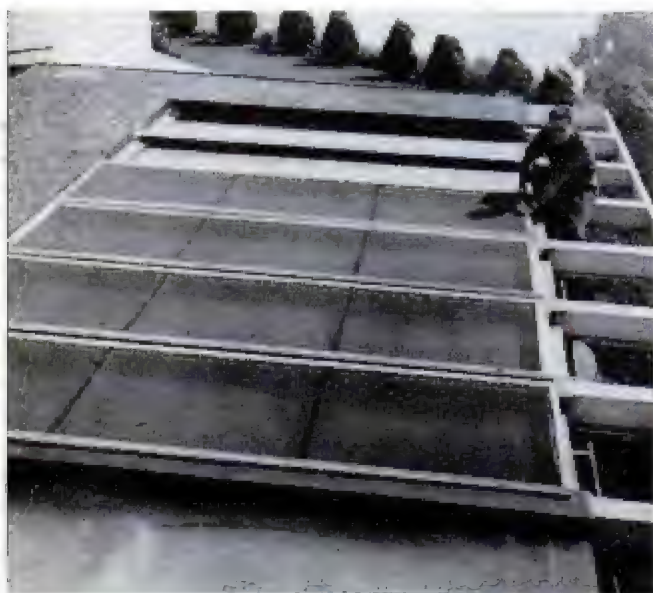
"Convertible" Living Room Features Slide-Away Roof

MEMBERS OF a California family can dine under the stars or picnic under a blue summer sky without ever leaving the house. A push of a wall button slides back four glass panels which form a large portion of the living-dining-room roof. Together with two walls of clear glass, the open roof provides a feeling of being out-of-doors while enjoy-

ing all the comforts of home. The translucent panels, three feet wide and 12 feet long, are chain-operated by a single electric motor and retract simultaneously into the solid portion of the flat roof. Bamboo screening is pulled out below the panels for daytime sun-control. When closed, the glass roof is completely waterproof.

Overhead screens protect roof openings from leaves and insects. Panels retract into solid portion at left

Ceiling is low enough for easy cleaning or repair. Slide-out bamboo screens provide shade on sunny days



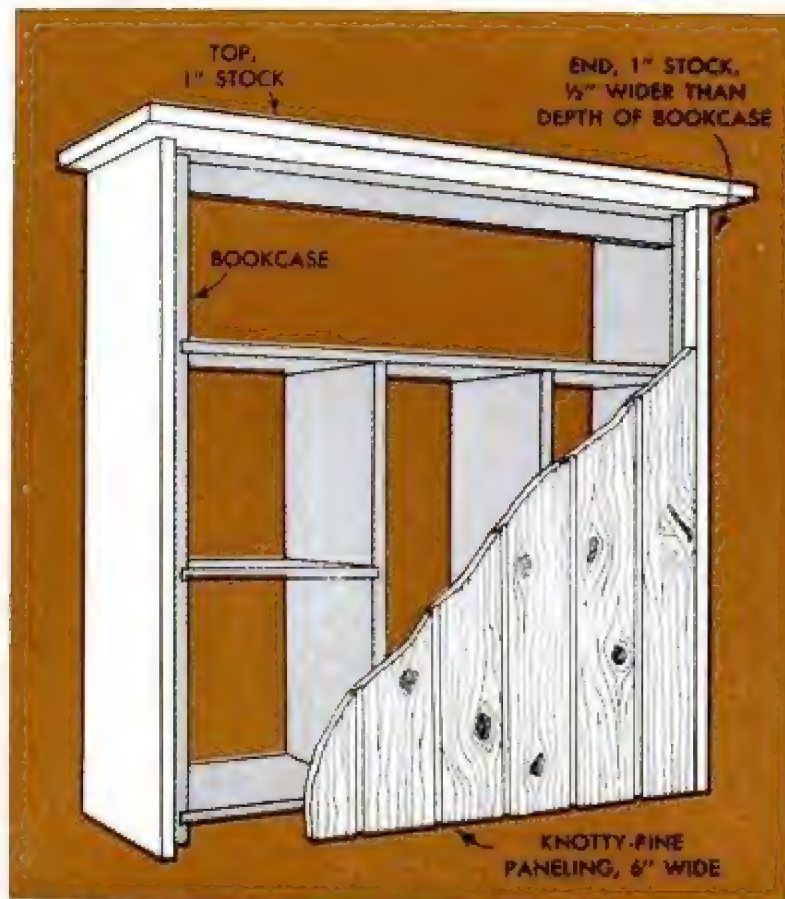
the **POPULAR MECHANICS** CRAFTSMAN

BOOKSHELF TURNS SNACK BAR

THE SAW-AND-HAMMER craftsman especially will go for the simplicity of this smart-looking snack bar, for half the job is already done by using an open-type bookshelf to provide the interior shelves. It makes an ideal one-evening project, as all that is required to convert the bookshelf into a snack bar is to face the front with knotty-pine paneling and cover the top and ends with plain 1-in. boards. E. L. Fisher of Milwaukee, Wis., made the bar pictured below by starting with a 9 x 36 x 36-in. bookshelf as the basic structure. If you don't happen to have a bookshelf, you'll be ahead by purchasing an inexpensive, unpainted one at a department store. Figure out the number of boards you'll need to cover your particular shelf, picking out select tongue-

and-groove material in which the knots are uniformly distributed. The cutaway drawing on the following page shows how the end boards are allowed to project at the front to cover the edges of the knotty-pine boards. Use boards of uniform width or at least space them so that the two outside





boards are of nearly equal width. The tongue on the starting face board will have to be cut off to make a flush, butt joint with the piece covering the end. Allow the snack-bar top to overhang the ends and the front, and in nailing the top and ends to the bookshelf, use short nails so they do not extend all the way through. Beveled edges on the knotty-pine paneling provide V-joints on the face of the bar to relieve the plain front. The top of the bar may be covered with oilcloth or linoleum and the edges trimmed with regular stainless-steel counter-top edging. A piece of decorative laminate may be cemented to the top to give a durable surface that can be cleaned quickly. It is best to line the shelves with oilcloth or plastic fabric. To retain the natural finish of knotty pine, apply a wash coat of clear shellac, rubbing it when dry with fine steel wool and then follow with wax. ★★★

Adapter Sleeves Increase Size of Undersized Bit Shanks

When a hand-type grinding tool requires different collets for $\frac{1}{8}$ and $\frac{3}{32}$ -in. shanked tools, save time by fitting the undersized tools with adapter sleeves so both sizes can be chucked in the $\frac{1}{8}$ -in. collet. The sleeve, which is No. 30 soft-iron wire wound around a $\frac{5}{64}$ -in. drill shank to form a closely wound coil $\frac{3}{8}$ in. long, is twisted on the shaft in the opposite direction of the winding, causing it to expand as it slips over the shank. This provides a perfectly aligned $\frac{1}{8}$ -in. sleeve which grips the shank securely and increases its diameter.

Andrew Brennan, Philadelphia, Pa.



Wooden Drawer Pull Protects Hand Used to Strike Center Punch



When center-punching thin sheet metal by striking the punch with the heel or palm of the hand, a drawer pull fitted over the end of the tool as shown will protect the hand. Drill the underside of the knob to fit snugly over the end of the punch.

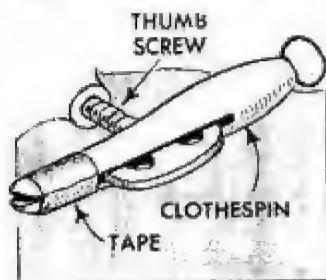
Ken Murray, Colon, Mich.

Handle for Yardstick

A yardstick used at a blackboard or for measuring rooms will be easier to manipulate singlehandedly while drawing lines or marking distances if a drawer pull is attached in the center. Screws are counter-sunk on the side opposite the handle and ground flush on an emery wheel.

E. V. Reyner, Townsend, Mont.

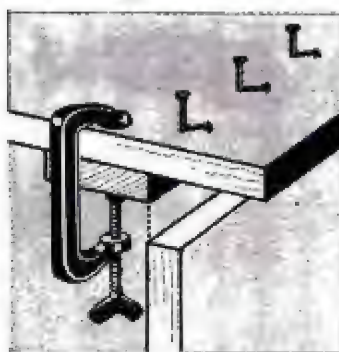
Improved Thumbscrew "Wrench"



In an emergency, a common clothespin will come in handy for loosening or tightening a thumbscrew. Slip the pin over the head of the screw and press the legs together. If this isn't sufficient, wind two or three turns of adhesive tape around the ends of the legs as shown.

G. E. Hendrickson, Argyle, Wis.

Nailing Boards at Right Angles



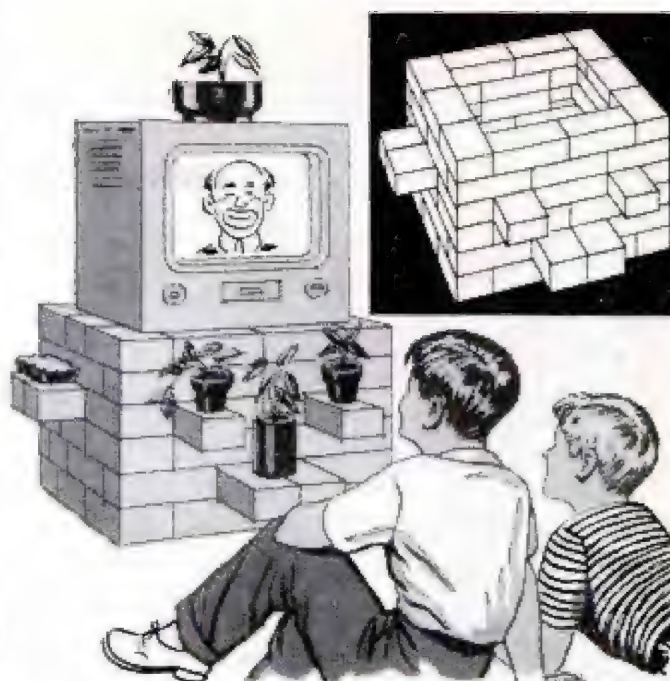
To nail two boards together at true right angles, first draw a guide line on the inside of the overlapping board and clamp a block of wood even with the line. Then place the upright against the block and nail in place.

When nailing long boards together, set them on edge and square at the corners of a box for nailing.

Dick Hutchinson, San Gabriel, Calif.

Rubber Patch Cemented to Heels Prevents Wear Along Edges

Run-over heels on shoes can be prevented by cutting out small pieces of inner tube and cementing one to the outer edge of each heel to serve as heelplates. The portion of heel surface to be covered as well as one side of the plate is roughened with the sharp edge of a knife blade. Following this, a thin coating of weather-strip cement is applied with a knife or small spatula. After the cement becomes tacky, the plate is pressed against the heel and the outer edge trimmed even with the edge of the heel if necessary.



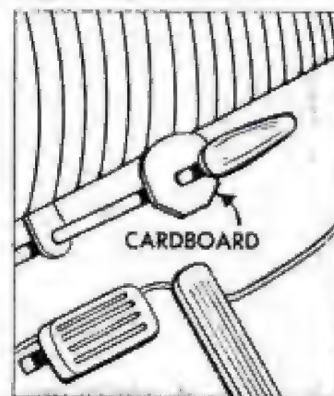
Unusual Stand for Television Set Formed With Loose Bricks

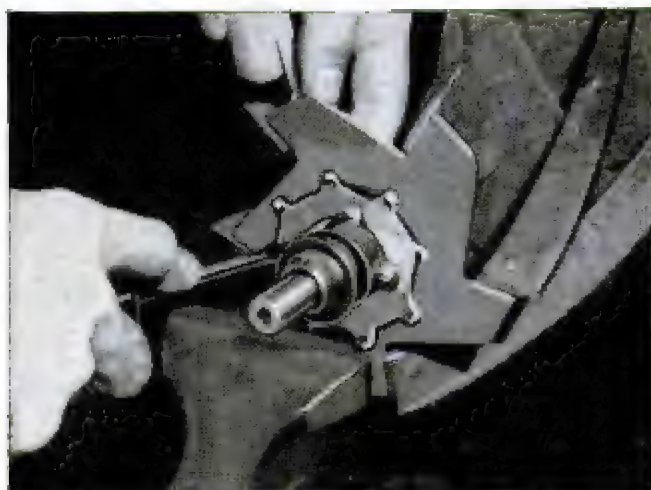
Designed for rooms in which a touch of modern decor is desired, this attractive and unusual stand for a table-model television set is made entirely of brick. No mortar is used since the bricks are stacked squarely on each other and held in place by their own weight. Any type of brick can be used, but colored face brick and the modern long, thinner brick will lend more to the design than will the common type. Care should be taken in selecting the brick to see that only those with undamaged edges and corners are used, because of both appearance and stability. Projecting bricks may be used as shelves to hold flowers, cigarette trays or knickknacks.

Walter L. White, Chicago.

Colored Cardboard Tab on Lever Warns of Set Emergency Brake

On certain makes of cars it's possible to install a simple indicator which will call attention to the fact that the emergency brake is on. A bright-colored cardboard tab is fitted to the brake lever just below the handle where, when the brake is off, it is almost completely hidden under the dashboard. However, when the brake lever is pulled out, the tab is plainly visible and serves as a warning to the driver. Simply slot the cardboard to fit over the lever shaft and tape it in place.

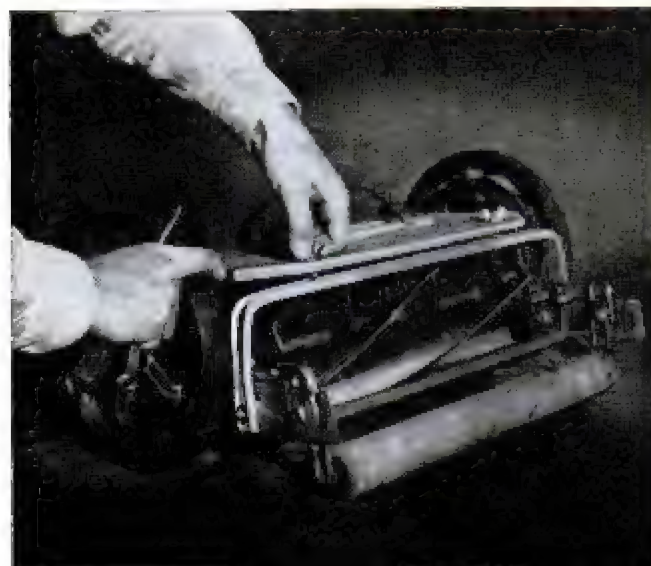




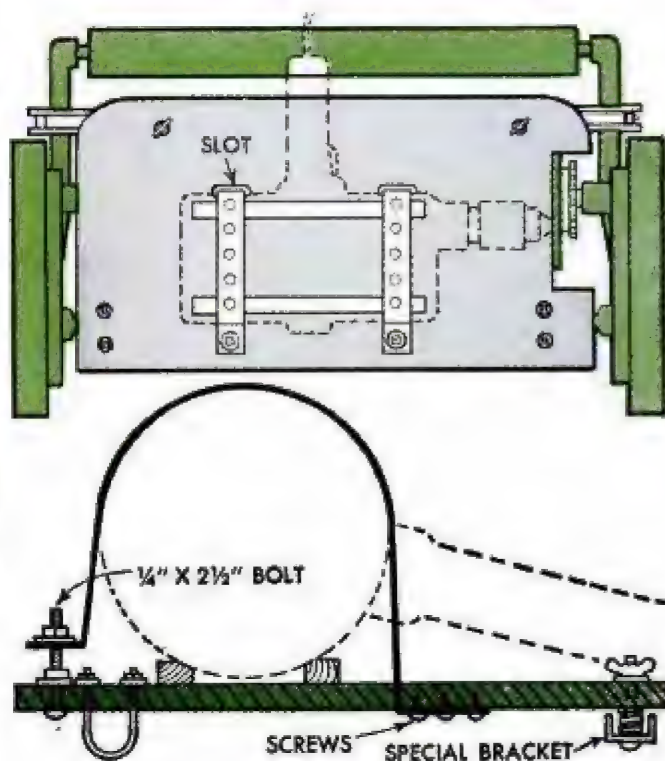
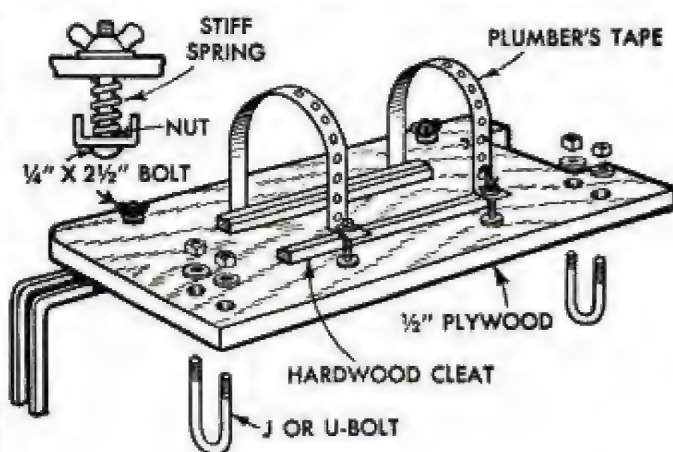
The driven sprocket can be bolted to a sheet-metal reel spider with a hardwood spacer between. Cast reel spiders may require the use of J or U-bolts



Above, interchanging pawl pinions permits reel to drive mower wheels forward. Below, motor base is spring-mounted to bracket bolted to mower frame



IF YOU HAVE a portable electric drill of $\frac{1}{2}$ -in. capacity and a no-load chuck speed of 300 to 500 r.p.m., put it to work on your lawn mower or rotary garden cultivator. Only a quality drill that can stand continuous operation should be used. It's a fairly simple job to convert the mower or the cultivator for driving with the drill. The latter is mounted similarly in both cases, and can be interchanged between the two machines or removed for normal use in just a few minutes. Essential steps in the conversions will be clear from the accompanying photos and details. Two bicycle rear-wheel sprockets and a short length of roller chain are needed for the mower conversion, but only the large sprocket from a child's bike is needed for the cultivator, as the same drive sprocket



MOWER

By Tom Riley

is utilized on the drill in both applications.

The electric-drill drive is mounted on the mower as in the details and photos on the opposite page. The first step is to dismantle the mower completely so that the driven sprocket can be mounted on the reel spider as in the upper photo. If the spider is of sheet metal, it can be drilled and the sprocket bolted to it as shown. Cast spiders may require the use of either U or J-bolts. It also may be necessary to anneal the sprockets before drilling. This is done by heating to a cherry red and allowing to cool slowly. Clearance for the drive chain probably will require cutting off the ends of the reel blades. When the mower is reassembled, the pawl pinions are interchanged as in the center photo on the pre-

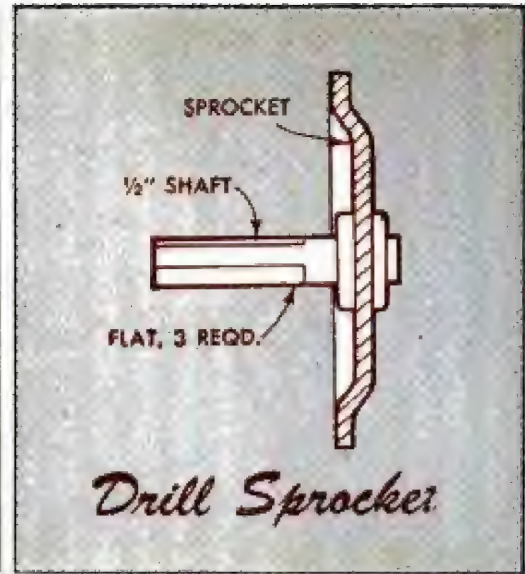
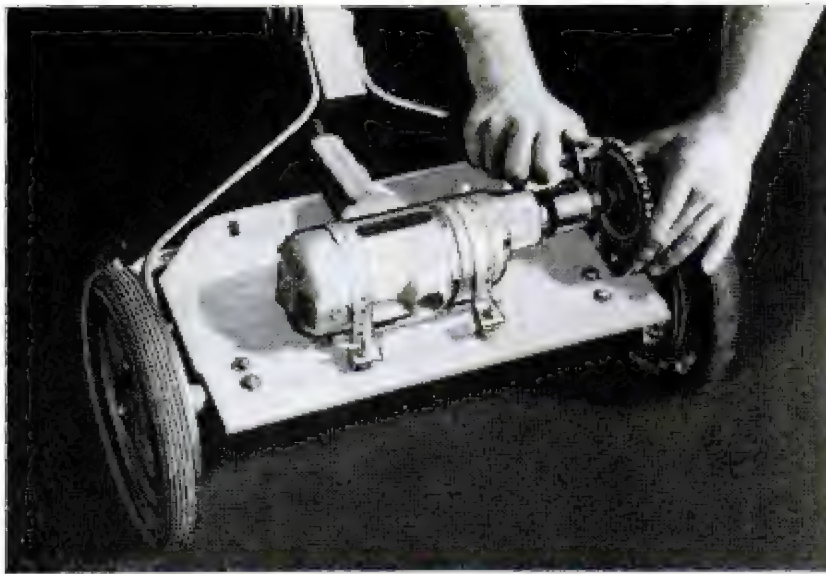


Motor is controlled by combination switch outlets mounted on mower and cultivator handles



ceding page. This change permits the driven reel to turn the mower wheels in the forward direction. On some mowers an adjusting screw permits locking of the pawls without interchanging.

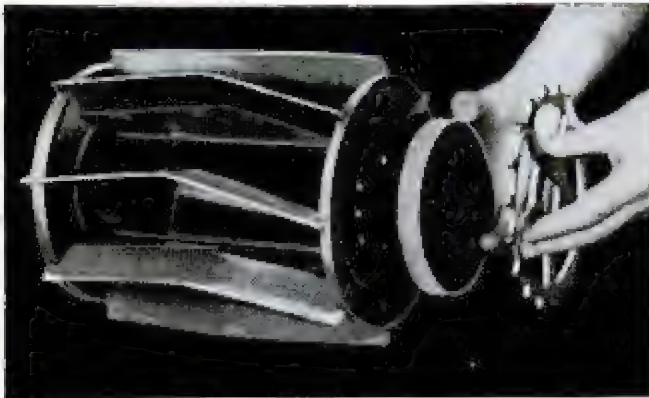
The plywood base supporting the drill must be adapted to the mower. It is attached with U-bolts to the shrub bar at the front of the mower and is supported at the rear on a U-shaped bracket of 1-in. steel channel. Note the spring mounting of the plywood base as shown in the lower detail on the opposite page. This assembly



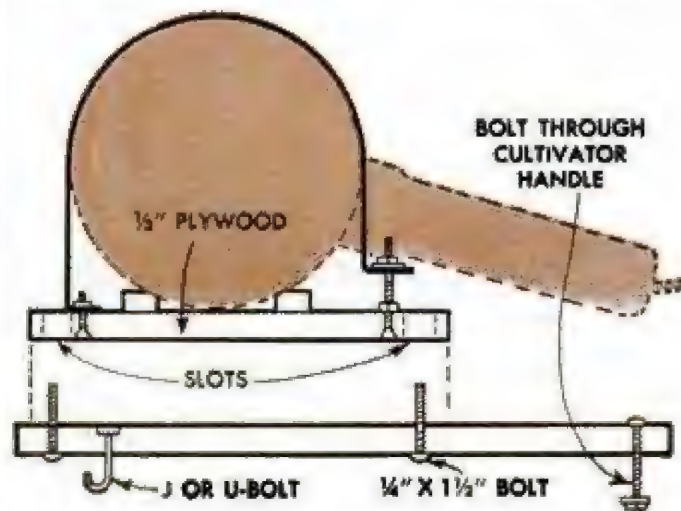
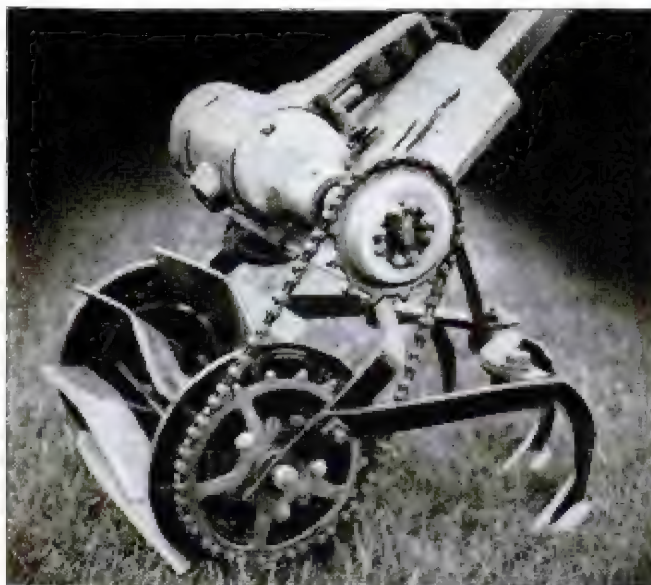
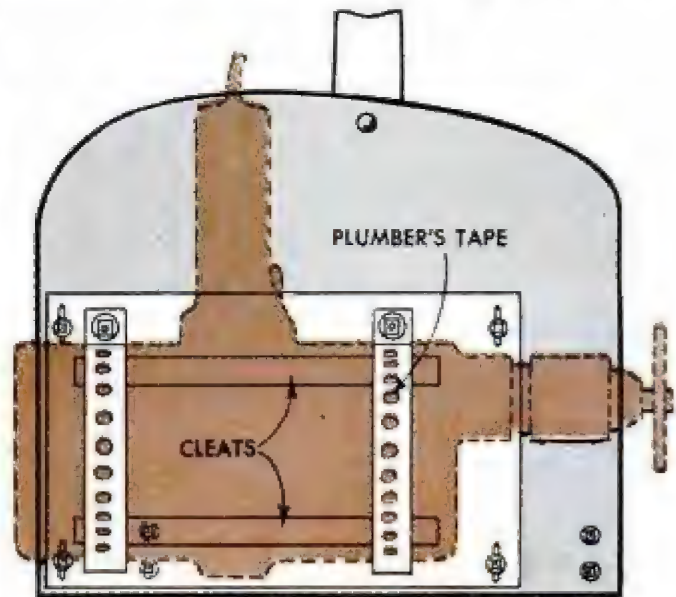
Sprockets must be in line when mounting motor on mower or cultivator. Misalignment causes power loss

permits close adjustment of the chain tension. The drive sprocket, which is chucked in the drill, is attached to a short spindle as in the detail above. Note that three equidistant flats are milled or filed on the spindle to prevent slippage of the drill chuck. When mounting the drill with perforated pipe tape as detailed, be sure that the sprockets are in line, as otherwise there

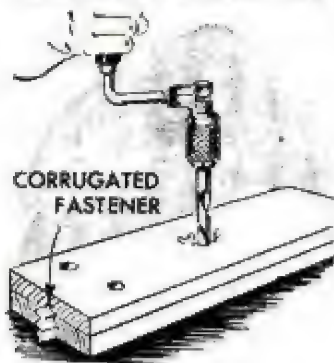
will be an appreciable power loss. To control the drill motor, outlet boxes are mounted on the handles of both the mower and cultivator, and the power cord is connected to a combination switch-outlet unit mounted in each box. The details and photos below show how the motor and driven sprocket are mounted on a rotary cultivator. The sprocket is bolted to the cultivator reel over a spacer. A crank sprocket from a child's bike is just right. ★ ★ ★



Above, sprocket from child's-size bike is bolted to cultivator drum, using hardwood spacer. Below, same drive sprocket is used on both mower and cultivator



Fastener Used as Clamp



When working in the shop, it is often necessary to bore matching holes in two pieces of wood. To do this quickly, drive a corrugated fastener part way into each end in the manner shown.

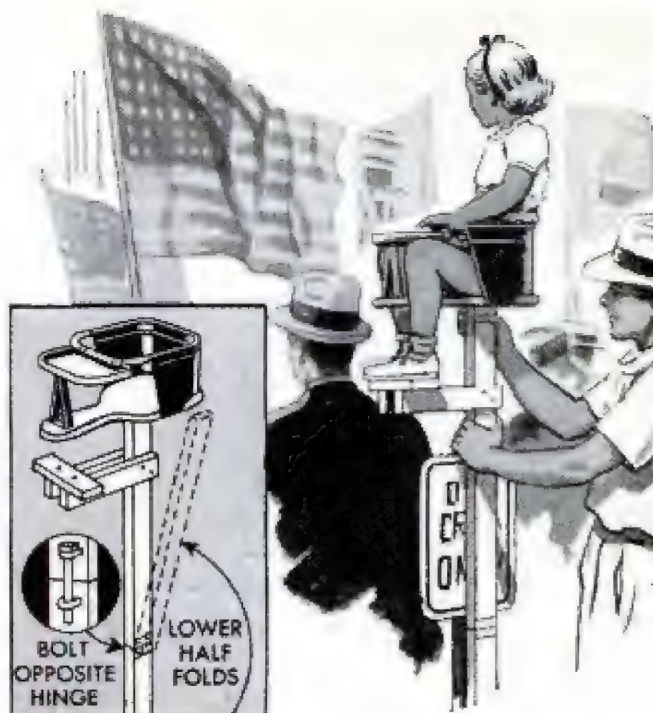
Drive Belt for Toy Motor Formed With Friction Tape

An endless belt suitable for temporary use with a toy electric motor can be improvised quickly from a strip of friction tape. Cut to the length required, add another inch for splicing the ends and twist all but the extra portion to form a round belt. After fitting the belt around the pulleys, wrap the open end around the other and press them together tightly. Only temporary at best, the splice can be strengthened further by applying rubber cement to the two ends before joining them together, and also by coating cement that has become tacky over the completed splice.

Inexpensive Pencil Sharpener Mounted on Small Jar

An inexpensive, desk pencil sharpener can be made easily with a 10-cent pocket sharpener and a 4-oz. widemouthed glass container. First cut an elongated slot in the screw cap of the container to accommodate the blade of the sharpener. Then drill two small holes in the sharpener, with corresponding holes in the screw cap and assemble with machine screws. The blade of the sharpener should face down so that pencil shavings are caught in the container and disposed of easily.

John J. Rea, Urbana, Ill.



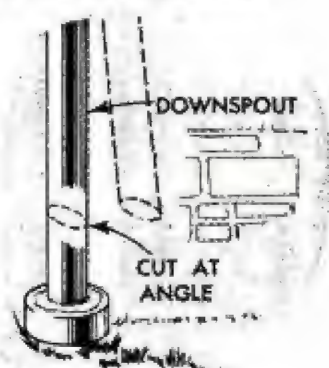
Perch Made From Baby Stroller Provides Child View of Parade

To provide his child with an unobstructed view of a parade, one father attached part of a discarded baby stroller to hinged lengths of 2 x 4s to form a perch that overlooked the heads of crowds lining the sidewalks. A footrest made from scrap stock was nailed at right angles to the upper supporting member. In use, the perch is rested against a traffic sign or a lamppost and a long bolt inserted through screw eyes opposite the hinge as shown to prevent the collapse of the support. To simplify transporting and storing, the lower half of the support folds against the upper half.

Mark Wienand, Olympia, Wash.

Cleaning Clogged Downspouts

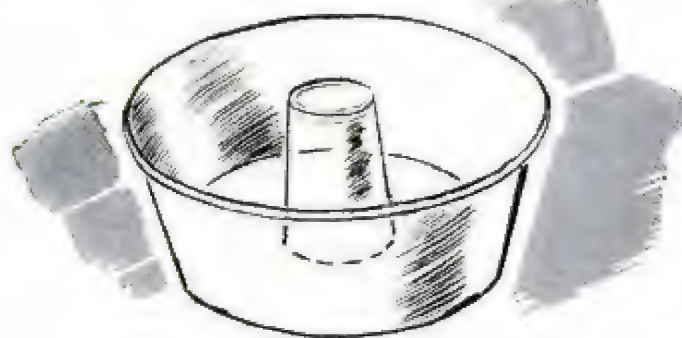
A downspout clogged with leaves and twigs presents a problem, since the accumulation should not be flushed into the drain, and lifting the spout for cleaning may not be practical. One method of solving this problem is to saw the downspout in two at an angle, so that it can be swung out for cleaning. After cleaning, the sawed edges are brought together and wrapped with several layers of medical gauze. White lead is worked into the gauze to preserve the "bandage" and to make the joint watertight.—Ed Packer, Chicago.



Solving HOME PROBLEMS



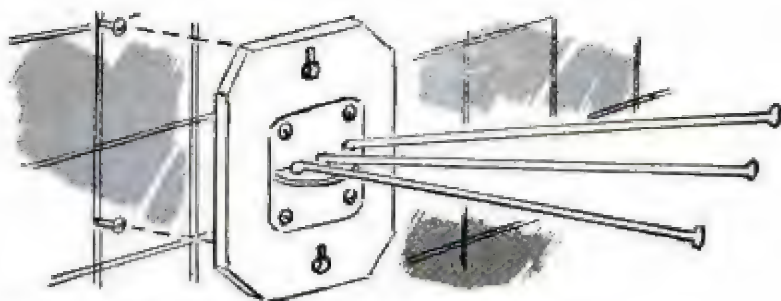
WHEN ADJUSTABLE WINDOW SCREENS do not fit snugly inside the frames, edges of the screens may be covered with rubber tubing to keep out insects. Slit tubing lengthwise, as above



VACUUM BOTTLE is filled easily without spilling beverage by using disposable funnel improvised from a paper drinking cup. The end of the cone-shaped cup is cut off to form a spout as pictured below



USE LARGE SCREW EYES as turn buttons to hold a sheet-metal flower box on a window sill. The screw eyes, driven into the window frame, are easily turned to engage or release the edge of the flower box

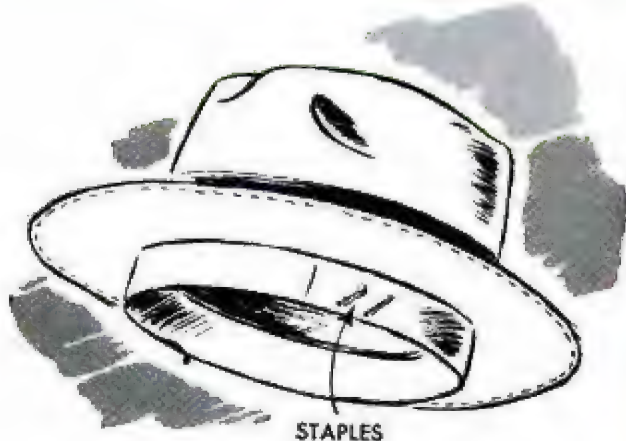


EXTRA TOWEL RACK may be removed from wall when not in use if mounted on plywood panel having two keyhole slots. Slots engage roundheaded screws driven into wall

TO ELIMINATE GUESSWORK when adjusting wall pictures, align the frames vertically with a weighted length of string. Hold the end of the string at a top corner of the frame, as below, so the weight hangs below the bottom of the frame. A pair of scissors serves as a weight



RUBBER KNEELING PAD for working in garden is made from sections of tire casing. Slots cut in sections form handle and casing is drilled so the two parts may be wired together or tied with heavy twine



STAPLES

WIRE STAPLES of type used for clipping papers together may be driven into sweatband of hat for quick identification. Staples are arranged to form symbols or owner's initials



SKIRTS PINNED TO COAT HANGERS won't pull together and wrinkle if the lower wire of each hanger is crimped at two points as shown above

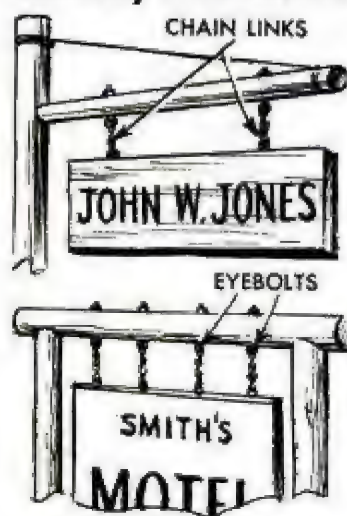


Wooden Block Provides Means Of Storing Fishing Leaders

A storage block for snelled fishhooks or leaders can be made from a scrap of wood and a few finishing nails. The nails are driven into one side of the block, the heads cut off and the nails bent slightly. In use, the fishhooks are stuck into the block and the leaders are stretched around the end of the block and fitted over the nails. They will stretch enough to make a snug fit.

R. A. Lossie, St. Paul, Minn.

Signs Suspended in Rustic Frames Held by Tire-Chain Links



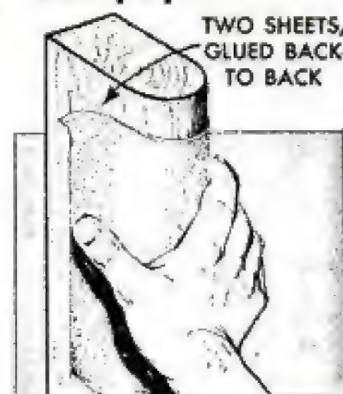
Eye-catching signs or address plaques that will sway in a breeze can be provided by suspending them from rustic frames with cross links from a tire chain. They can be supported either between two posts or from a cross member placed over two uprights. Address plaques can be suspended beneath a horizontal member extending from a single upright and braced with wire or light cable. The links are attached by spreading the ends and closing them on eyebolts in the posts or frame as well as on screw eyes driven into the sign.

Nick Mocharniuk, New York City.

Nonslip Back for Sandpaper

To prevent the hand from sliding off the back of a sheet of sandpaper while working, glue two sheets back-to-back. The side facing up will then provide a nonslip surface for the hand. A few dabs of glue are sufficient to hold the sheets together, and when one side is worn the paper may be turned over.

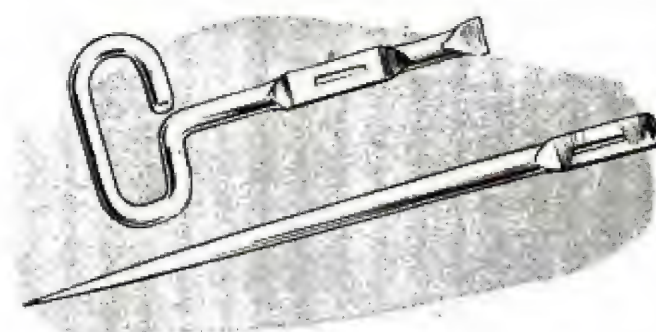
Arthur Trauffer, McClelland, Iowa.



Heavy Cloth Mended With Needle Made From Can-Opening Key

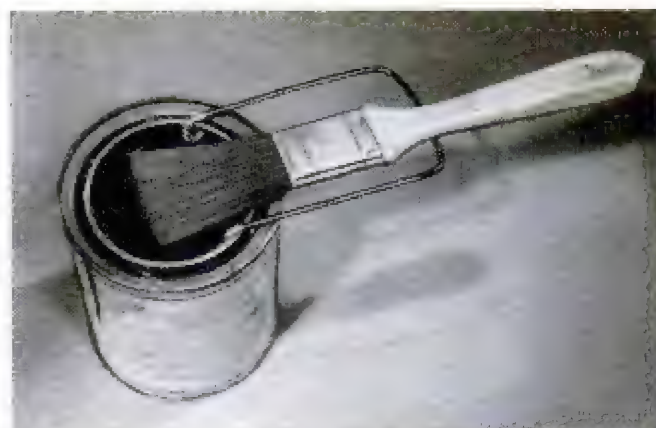
Lacking a large needle for sewing several torn awnings, a homeowner improvised one from a key-type can opener. After cutting off the tip beyond the slot in the manner indicated, the handle was straightened and ground to a long tapering point on the end.

William H. Henkel, New Orleans, La.



Wire Rest Holds Brush Over Pail

This simple paintbrush rest holds the brush over the pail when it is not in use, and yet does not interfere with the pail opening. Made from a length of coat-hanger wire, the body of the rest is bent in a long U-shape and the ends are fashioned into hooks that grip the lip of the pail.



36-in. Model of the **SS UNITED STATES**

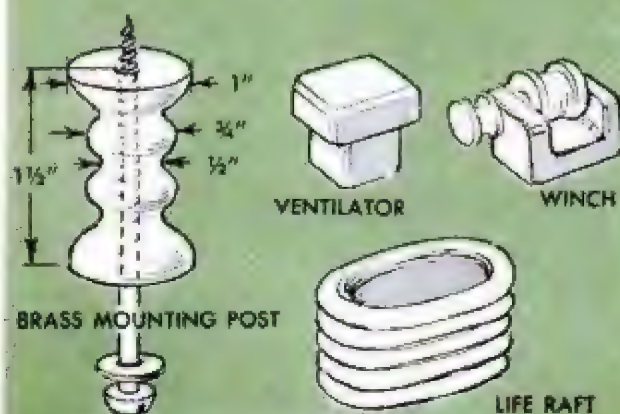
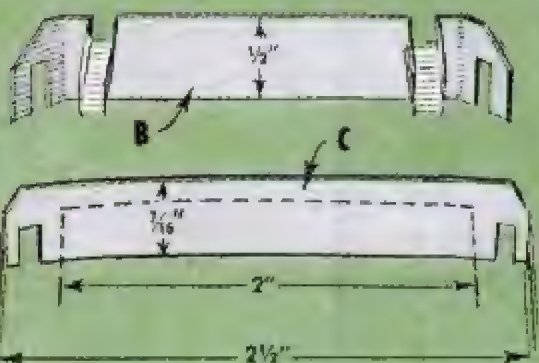
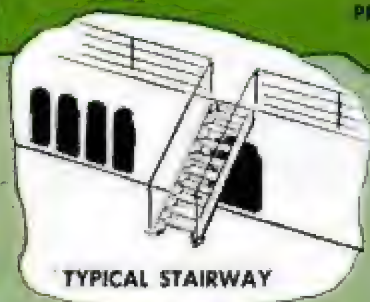
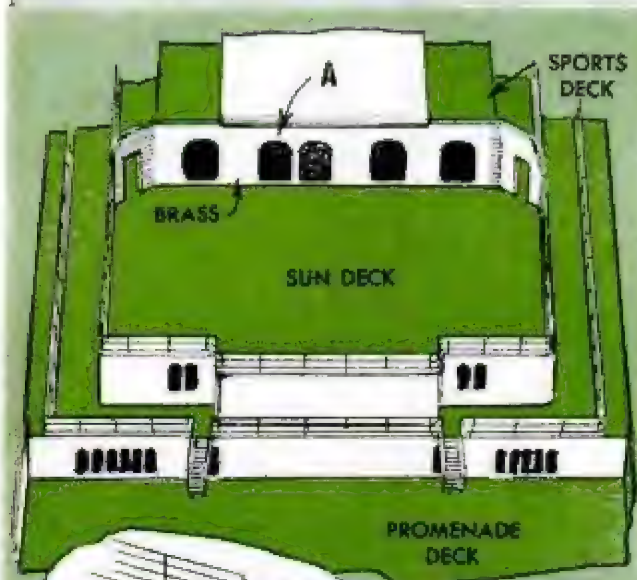
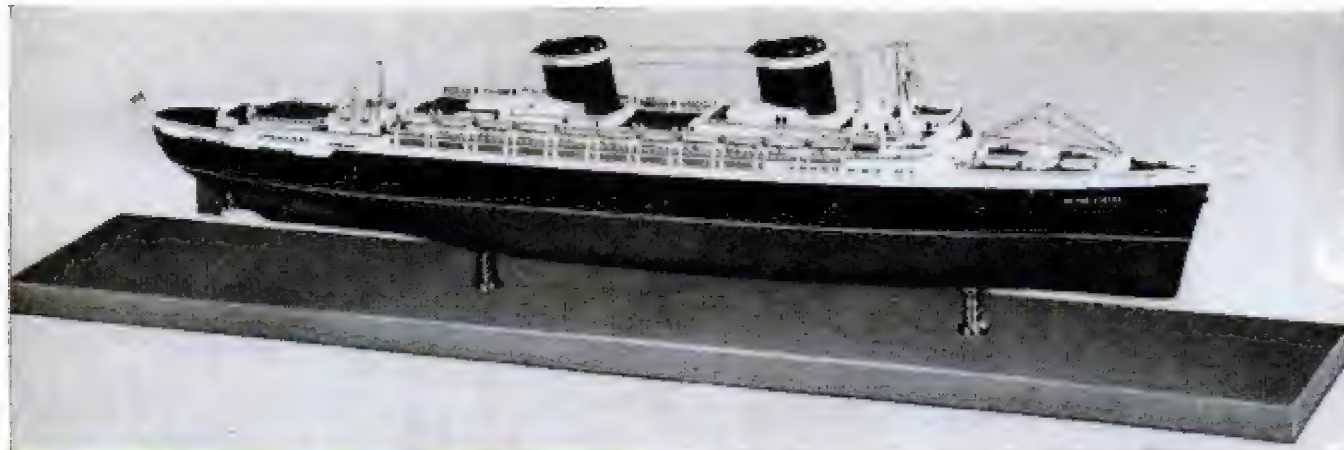
SOON YOUR scale model of America's mighty \$70,000,000 luxury liner, the *SS United States*, will be completed and under glass for all your friends to admire. In this concluding installment you will be shown how to make the cargo booms which are located fore and aft, how to rig the antennas between the stacks, how to fit the many tiny stairways that connect the various decks, how to mount the completed ship on a base and finally, how to make a protective plastic case for it. A last-minute change by the modelmakers who have been building the *SS United States* for this series of articles supersedes a detail given previously in Part IV. This pertains to the brass bulwark which is cemented to the fore end of the aft-stack deckhouse. The shape of this bulwark should be changed

By Wayne C. Leckey

Conclusion

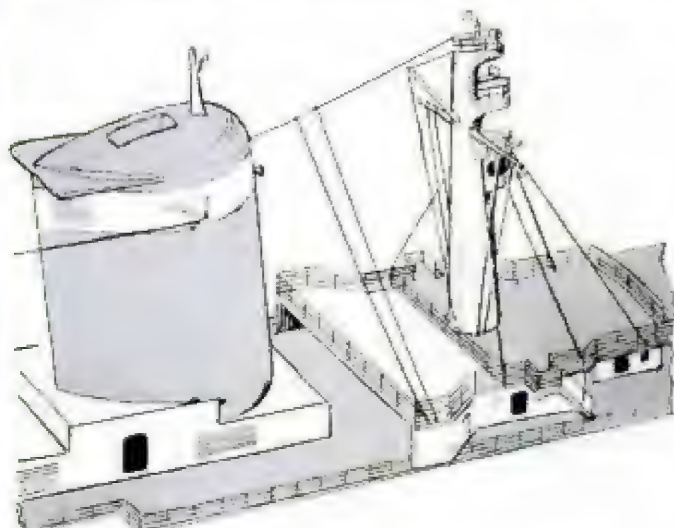
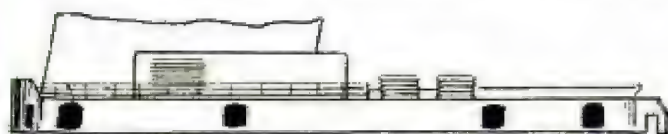


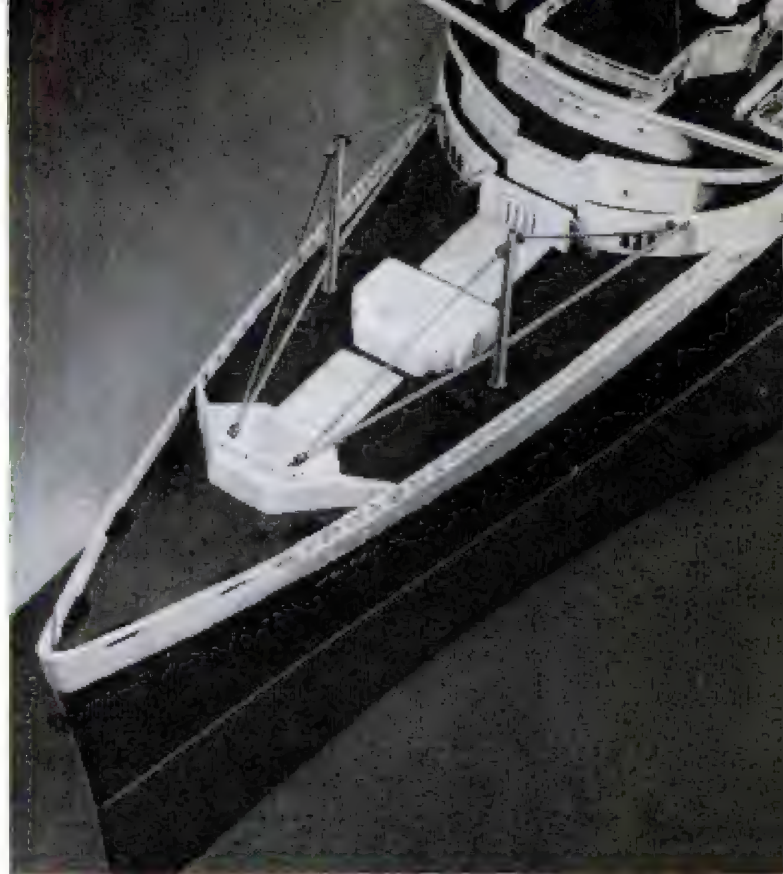
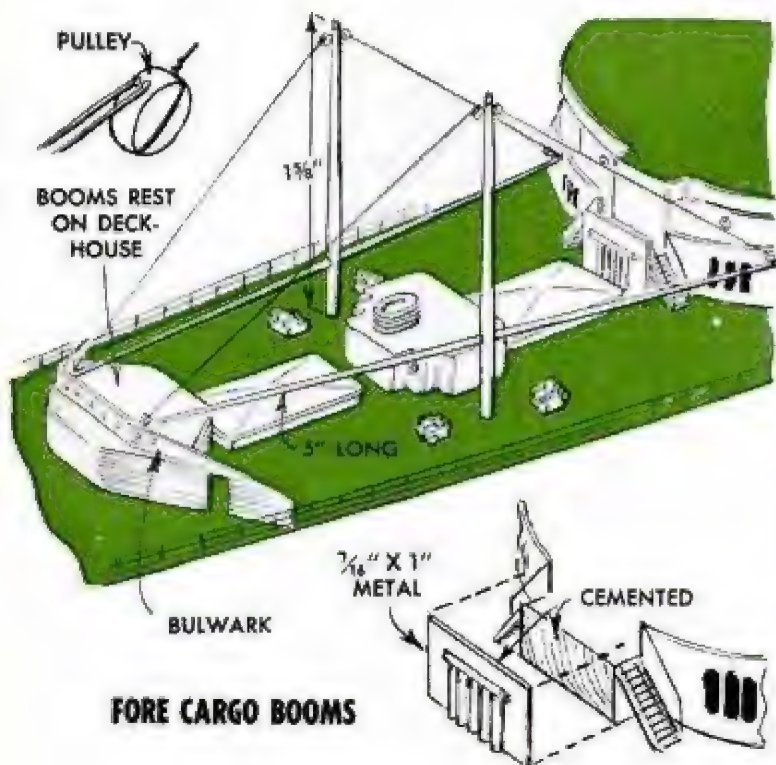
Here is the completed model of the beautiful *SS United States*, speed queen of the seas and the pride of America. Photos compare model with lines of actual ship



to coincide with the bulwark shown in detail C which is given in the drawing at the left. This differs primarily in that it is longer, and thereby extends from railing to railing which skirts the sun deck, and has doorways cut in it at each end.

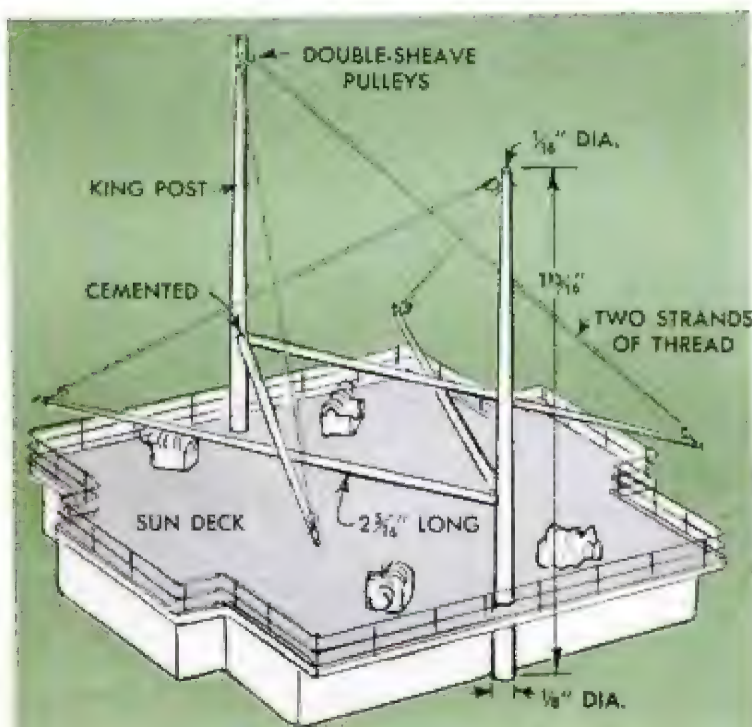
In resuming work, it is assumed that you have all the railings installed as described last month. Next, the aft end of the sports deck below the fore stack is fitted with a brass bulwark that is shaped as shown in detail B. In addition to notches formed at the ends to represent doorways, two other notches for stairways are made in the upper edge of the metal strip. The latter notches are filed down even with the sports deck, and the ends of the strip are bent outward at a 60-deg. angle. This strip is painted white after the stairways are attached and preferably before it is cemented to the end of the sports deck. A similar strip, part A, is cemented to the aft end of the sports deck which supports the aft-stack deckhouse. This is practically a duplicate of part C, except that, in addition to the doorways at each end, five others are represented by cutting small pieces of black paper and cementing them in place,

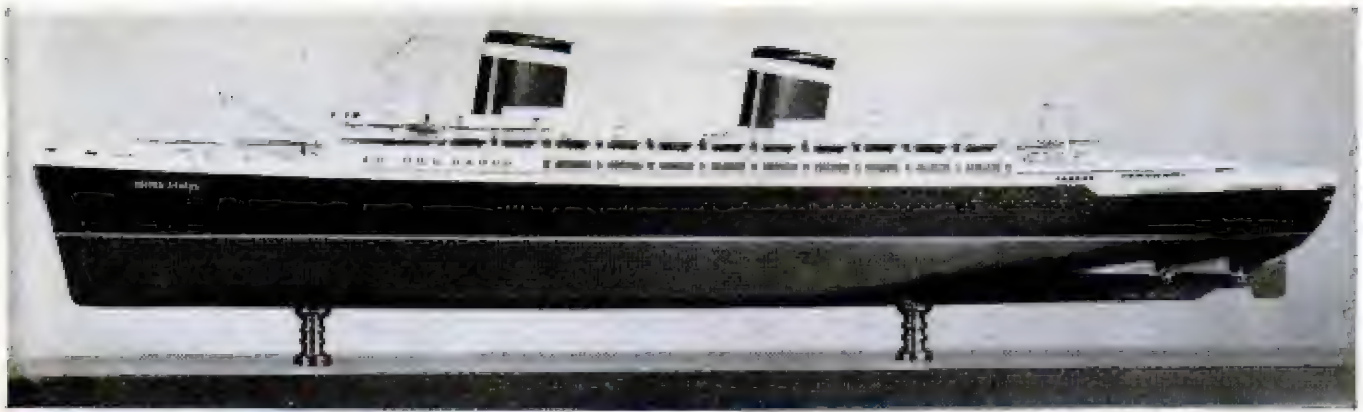




as indicated, after the strip is painted white. The aft end of both the sun and the sports decks are likewise fitted with black windows and doors in the same manner. Cutting these from paper and cementing them in place makes a neater job than trying to paint them. The stairways are stock parts but require soldering of fine-wire railings to each side. Twenty stairways are needed in all and their locations can be found by referring to the plan view given in Part I. The photos and details on this page show how the dummy aft and fore cargo booms are rigged. The king posts can be made either of wood or metal and tapered with a file or sandpaper. Note that these pass through the overhang of the sun deck

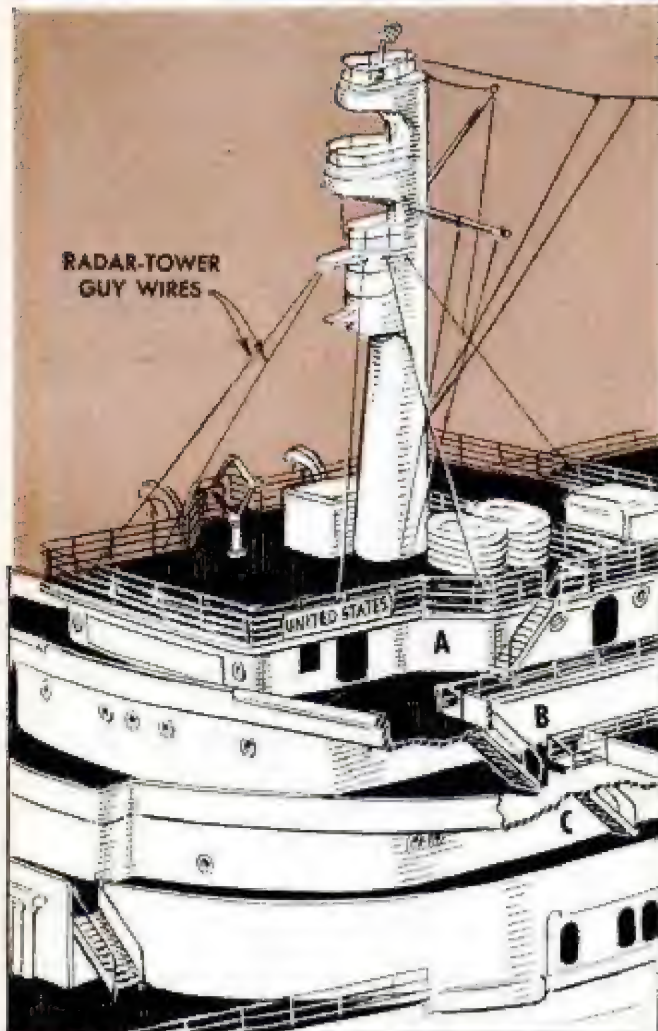
and enter the promenade deck $\frac{1}{4}$ in. The booms fit the king posts about $\frac{1}{2}$ in. up from the deck. In the case of the fore booms, the two booms of each king post are represented by a 5-in. length of wire tapered at the ends and inserted through a small hole drilled through the post. Note that the forward ends of the booms rest on the deckhouse, while the aft ends are held to the promenade-deck bulwark with small eyes formed of wire and inserted in holes in the bulwark. Two strands of thread represent cables for each boom and these enter holes in the pulleys only at the top where they are secured with a drop of household cement. The booms of the aft cargo hoists are rigged similarly, the booms being cemented to the king posts and rigged with thread as before. The booms and





**UNITED STATES
UNITED STATES
UNITED STATES**

Neat job of applying ship's name is done by cutting out the above lettering and gluing directly to hull

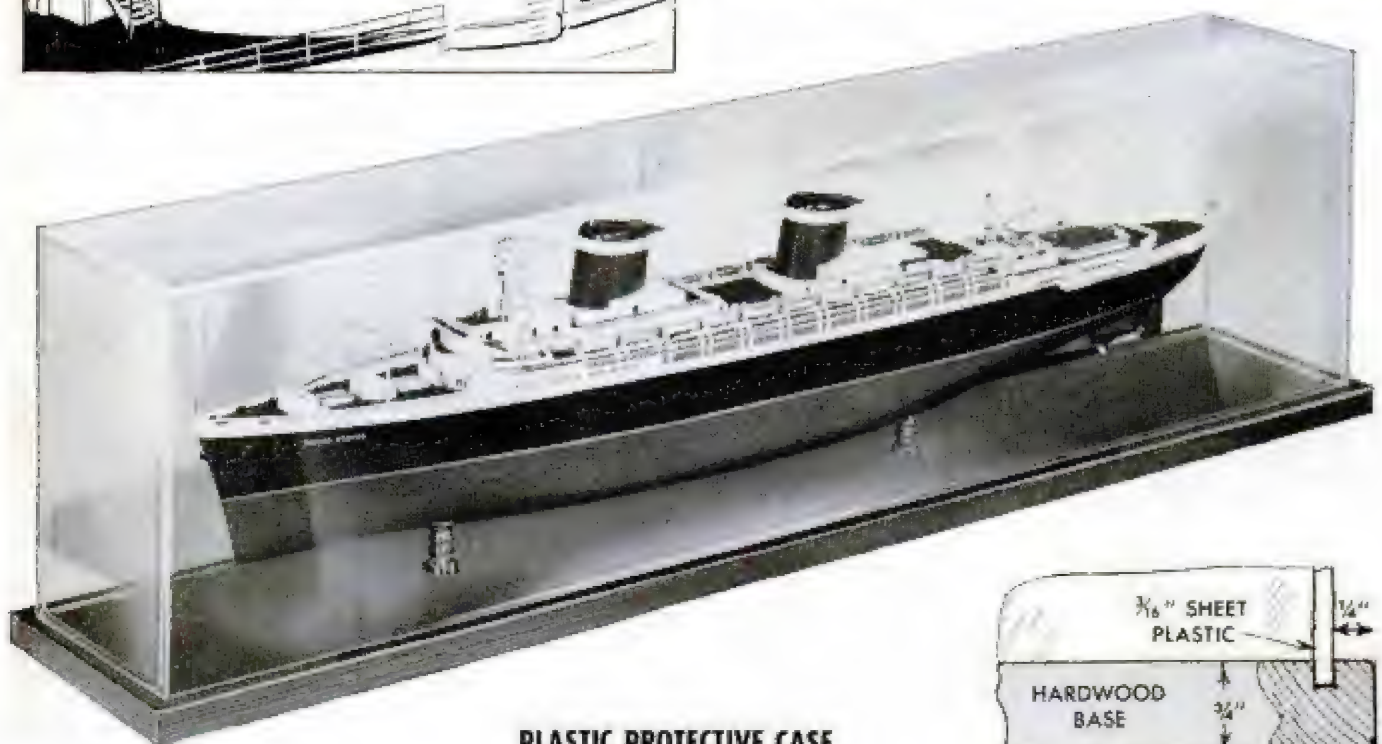


king posts are painted aluminum. The tiny pulleys are attached with fine wire to the top of the king posts and to the outer ends of the booms. A winch is provided for each boom. Eight are required and these are furnished in a kit which includes all the other fittings needed. The plan view in Part I shows where the winches are placed, as well as all other deck fittings, such as the capstans, bitts, roller chocks and loop antenna. Thread rubbed with beeswax or fine wire is used to represent the two antenna wires which run from bracket to bracket on each side of the stack.

The detail at the bottom of page 180 shows the rigging of the radar tower, and how the radio wires are run to the wheel-

UNITED STATES

UNITED STATES



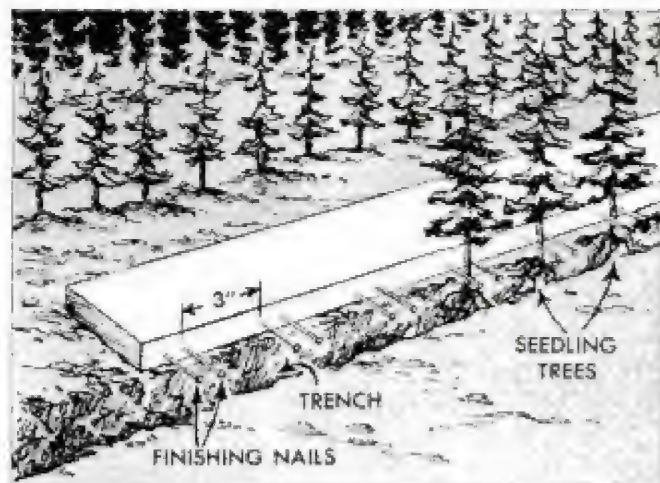
PLASTIC PROTECTIVE CASE

house from a single wire or thread that stretches from the top of the radar tower to the center of the fore stack. Name plates for the ship, which are given on page 182, are actual size so you can cut them out and glue them to the black hull. Place one on each side at the bow and the other around the end of the stern. In addition to these name plates, two smaller ones are given for mounting on the railing above the door of the wheelhouse on the navigating bridge. These are cemented first to thin cardboard, then trimmed to size with a razor blade and cemented to the railing.

There are several ways to make a protective case for your model, using either glass or plastic. Perhaps the neatest case is made of sheet plastic, cementing the panels together flush at the edges and letting the completed case rest in a groove routed around the edges of a finished mahogany baseboard. If you prefer a case made of glass, the top panel can be set in a wooden frame, like a picture frame, and glued and screwed to grooved posts at the corners, after which the assembled case is attached to the baseboard with flat-headed wood screws driven up through the bottom and into the posts. The baseboard should measure about $7\frac{1}{2}$ in. x 39 in. The two brass posts which support the model on the baseboard are turned to the shape given and bored lengthwise to take long screws, the heads of which are set flush in counterbored holes in the underside of the baseboard. A wire flagstaff, 1 in. long, is fitted at the stern and the bow of the model, the stern staff flying a tiny American flag measuring $\frac{1}{4}$ x $\frac{3}{8}$ in. Full-size patterns for marking the deck, sheer and water-line outlines of the hull, plus actual-size carving templates are given in a set of two blueprints. Construction details are given in an additional set of two sheets. Construction kits are available which contain the lifeboats, davits, quadruple screws, anchors, stairways, portholes, running lights, whistles and all the other tiny deck fittings that are needed. ★ ★ ★

Correct Use of Paint Roller Gives Smoother Finish

Paint rollers afford the home painter one of the fastest and easiest ways of turning out a good paint job on walls. Before using the roller, "cut in" around the ceiling corners and woodwork with a 2-in. brush. Then apply the paint by running the roller lightly and continuously back and forth. Do not press too hard. Cross-roll if necessary to fill in the missed spots, but always finish by rolling all strokes in one direction. Be sure to clean the roller immediately after use.



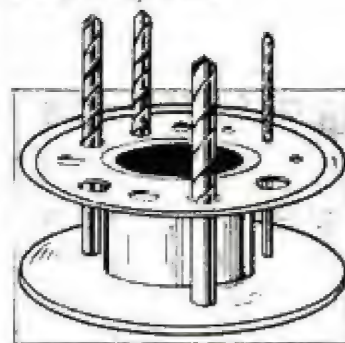
Guide for Spacing Seedlings Speeds Transplanting

Tree and plant seedlings can be spaced uniformly during transplanting with a guide made from a flat board and finishing nails. To transplant a number of seedlings quickly, dig a trench to the required depth and then place the guide alongside it. The seedlings are placed between the nails with their roots in the trench, and then the earth is replaced and compacted around the roots of each plant by hand.

Drill Stand From Tape Spool

A simple stand for twist drills can be improvised from an adhesive-tape or typewriter-ribbon spool. One side of the spool is drilled with the bits to be stored in it as indicated. To make the stand heavier and less likely to tip, the center of the spool can be filled with plaster.

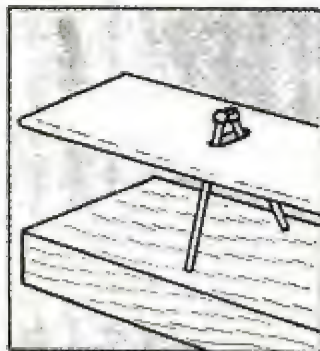
John A. Comstock, Wellsboro, Pa.



Inventory List Taped to Freezer

Desiring a home-freezer inventory chart that could be posted close at hand to assure keeping entries up to date, one homeowner listed the items on sheets of paper and taped them with freezer packaging tape to the cover of the freezer. Opposite each entry, rows of check marks were made representing the number of units stored. Whenever a unit is removed, a line is marked through the check to make an "x." Then, to make sure a pencil always would be handy, he obtained a small magnet of the type having a wooden handle. The handle was drilled to take a pencil stub, after which the magnet was stuck to the cover or side of the freezer.

Jig for Painting Venetian Blinds

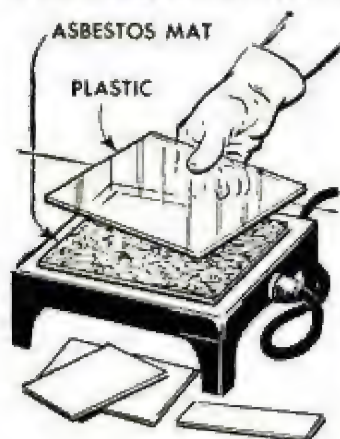


A jig to simplify the painting of Venetian blinds can be made of a 1 x 3-in. board, 6 in. longer than the slats to be painted, and finishing nails, which are driven at each end of the board to form inverted vees. The

vees should be placed so that the slots in the blind slats just fit over them. The slat is placed in the jig and one side is painted. Then the slat is carefully turned over by holding both ends with the finger tips and the other side is painted. After painting, the slat can be hung over a nail driven into an overhead beam in the basement and allowed to dry.

E. V. Moore, Rockville Center, N. Y.

When Bending Sheet Plastic Use Asbestos Mat Over Heat

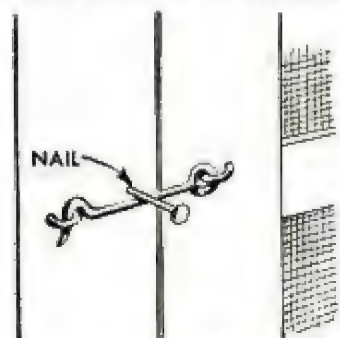


When heating sheets of plastic on a stove or hot plate for forming, place an asbestos mat between the heat and the plastic. Plastic material should never be placed in direct contact with high heat. Cotton gloves are recommended for handling hot plastic sheets, but

the plastic should be gripped only lightly or an imprint of the glove material will remain in the plastic after it is cool.

Harry X. Lawson, Pala, Calif.

Nail Locks Window-Screen Hook



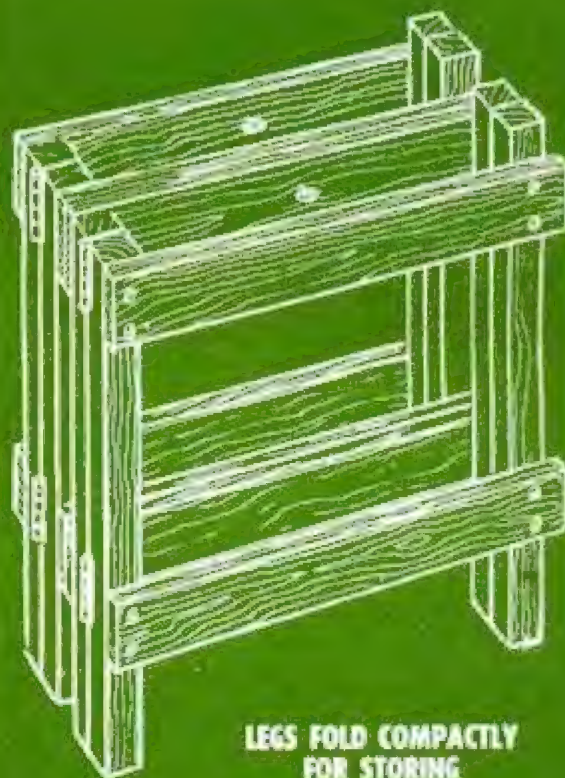
To prevent children from unhooking window screens and storm windows which are held in place by common screw hooks and eyes, simply drive a nail over the hook as indicated. Allow

the nail to project far enough so that it can be removed easily when necessary. This simple safety device may prevent a serious fall.—R. F. Donovan, Guttenberg, N. J.

PLAN of the MONTH

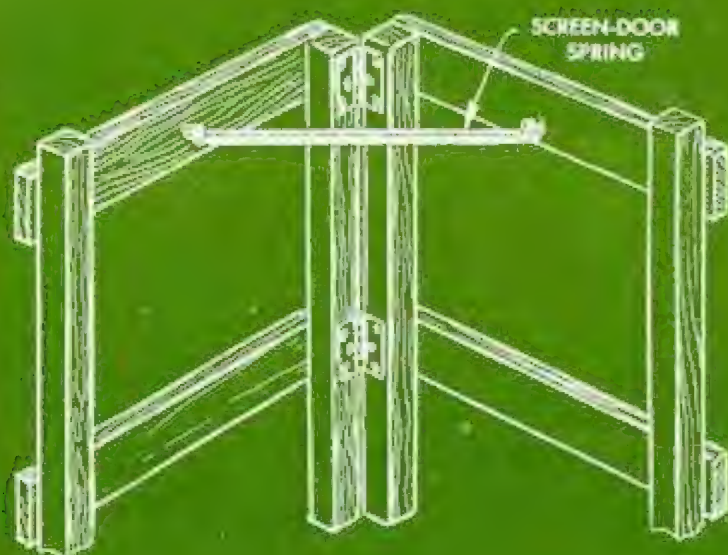
Have you wanted a picnic table for back-yard barbecue parties but have wondered where you would put it when winter comes? This knockdown one solves the problem completely as the leg assemblies and plank top can be tucked away in a minimum of space in the basement or garage. Redwood makes the most durable table, but pine or cedar will do, and all members are dimensioned lumberyard stock. A screen-door spring makes each leg assembly stay put in supporting the plank top. A coat or two of resin sealer will prevent weathering. The plank top can be of any length; planks 8 ft. long will seat eight persons comfortably, while 11-ft. planks will take care of 12 persons nicely. Aligning pins in the edges of the plank leaves keep them from shifting

By John Bergen



LEGS FOLD COMPACTLY FOR STORING

... Knockdown Barbecue Table



MATERIAL LIST

Dimensioned lumber

3 pcs.—1 $\frac{3}{4}$ " x 11 $\frac{1}{2}$ " x 8'—Top

Rough-cut lumber

4 pcs.—2" x 2" x 30"—Legs

4 pcs.—2" x 2" x 28"—Legs

8 pcs.—1" x 4" x 24"—Leg rails

Miscellaneous

3 doz. #12-2" F. H. screws

2 doz. #12-1 $\frac{1}{2}$ " F. H. screws

2 pr. 3" x 3" butt hinges

2 screen-door springs

1 length of $\frac{3}{4}$ " dowel

1 pt. waterproof glue

1 qt. resin sealer



LEG ASSEMBLY



Funnel From Whipped-Cream Can Used to Fill Brake Cylinder



When it is necessary to add fluid to the master brake cylinder of your car, the job can be done without spilling if you use an empty whipped-cream can as a funnel. Remove the bottom of the can with a rotary opener and fill with fluid. When inserted in the cylinder opening, a slight pressure against the neck of the can will cause the fluid to run.—J. H. Troy, Turtle Creek, Pa.

Rests Protect Outboard Housing



The rounded corners of the housing on some outboard motors permit them to roll easily when carried in the trunk of the car. To prevent this and also to protect the housing from being scratched when the motor is laid on the dock, drill and tap two $\frac{3}{8}$ -in. holes in the rear housing frame and install round-headed brass machine screws and brass spacers $\frac{1}{2}$ in. thick. These motor rests also will protect the motor side covers.

Clinton Hull, Costa Mesa, Calif.

Concrete Floor Made Watertight By Layer of Tar Paper

Tarred-felt paper laid over sand or gravel fill before pouring a concrete basement floor will provide a moistureproof barrier between the concrete and the underfill. Rake the surface of the fill smooth and allow it to settle for several days. To avoid puncturing the paper when pouring, cover

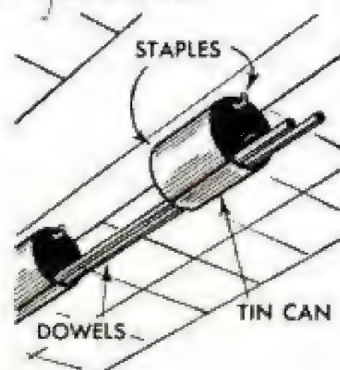
only as much of the underfill as you intend to cover with concrete each time. If the underfill is gravel or stone, pour the concrete carefully so that the tar paper will remain unturned.

Peter G. Gordon, Lansing, Ont., Can.

Ceiling Rack Stores Dowels

To store odd lengths of dowel stock and strips of molding close at hand but out of the way, keep them in a rack formed with two tin cans stapled or nailed to the joists overhead as shown. All that's necessary to prepare the cans is to remove the ends with a rotary can opener. Holes may be punched near the ends of each can to simplify driving the nails or staples.

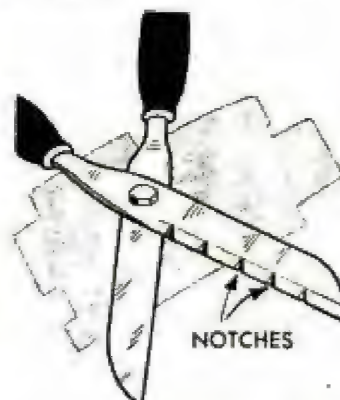
J. F. Landusky, Appleton, Wis.



Hedge Shear With Notched Blade Cuts Slippery Branches

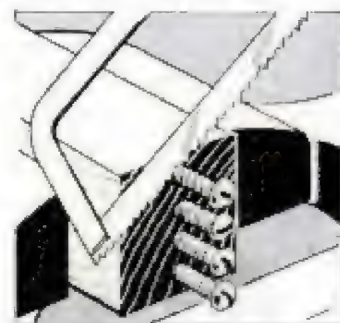
When trimming hedges, bushes and small branches of trees with a hedge shear, one homeowner overcame the annoying tendency of slender, smooth branches to slip from between the blades by notching the cutting edge of one blade as shown.

The notches are filed or ground so the sides of each are beveled to form miniature cutting edges.



Machine Screws Shortened Easily When Held in Block for Cutting

Machine screws can be shortened quickly with a hacksaw if you first drill holes in a block of wood and thread the screws in to the desired depth. For cutting, place the block in a vise or on the edge of the workbench. This method prevents the threads from being damaged by the vise and also allows a number of screws to be cut at one time.



is back 7 look *WTM 155*

BUILD "WILD GOOSE"

A Sturdy Overnight Trailer



By Vic Goertzen

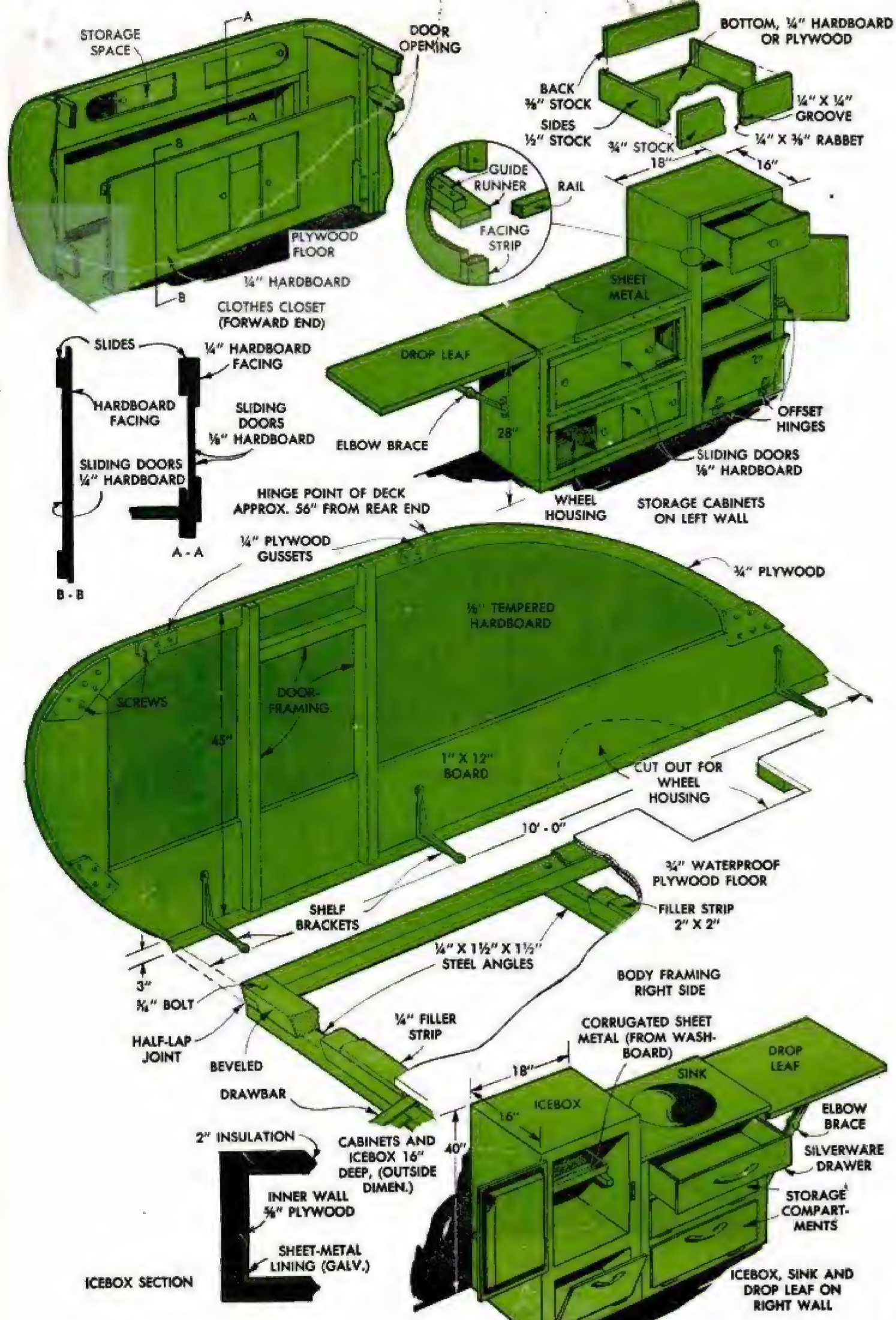
WTM 155

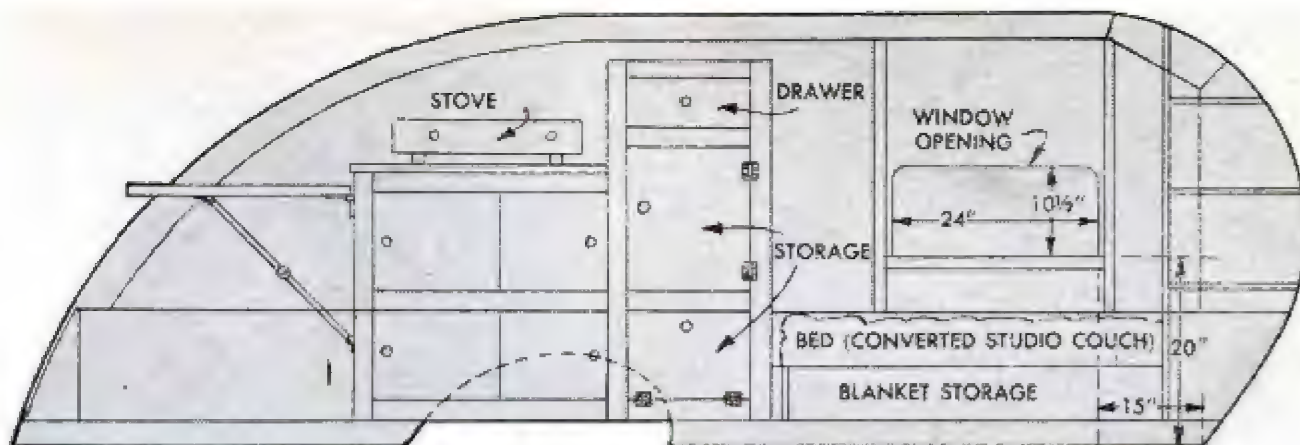
OVERNIGHT CAMPERS, hunters, fishermen and vacationers with limited time can appreciate the convenience, comfort and ready roadability of "Wild Goose." Hung low to the ground, yet with ample road clearance for the back trails, it tows anywhere your car will go. Keep it packed with the necessary bedding, also canned and dried foods and you can get away for a week-end trip in only a few minutes' time. When you arrive at the destination, Wild Goose sets up into a neat outdoor "kitchenette" in less time than it takes to put up a tent.

Looking over the details on the following pages you will note that the construction of this streamlined job differs somewhat from ordinary trailer construction. Where adaptations must be made only a few general dimensions have been given. Because the unit has been designed for road speeds up to 60 m.p.h. care must

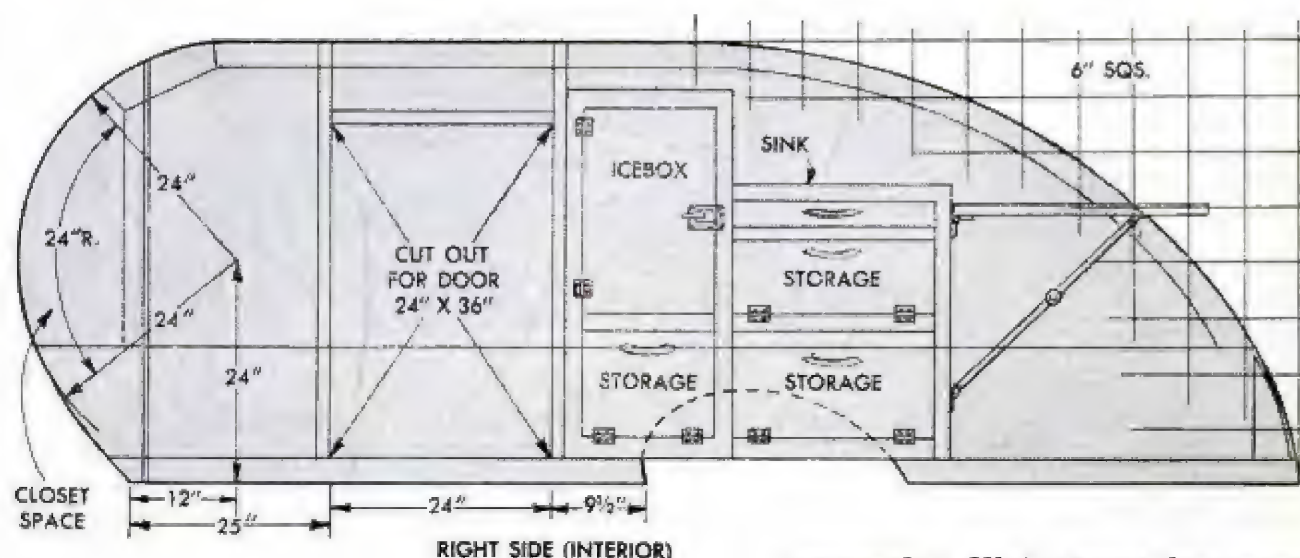
be taken when assembling the welded chassis frame. When notching the channel-steel side frames to form the first bend, cut the notches accurately so the meeting edges fit snugly before welding. The gusset plates should be at least 12 in. long, and at the forward end of the drawbar where the reverse bends open the cuts made in the channel webs it's a good idea to weld in



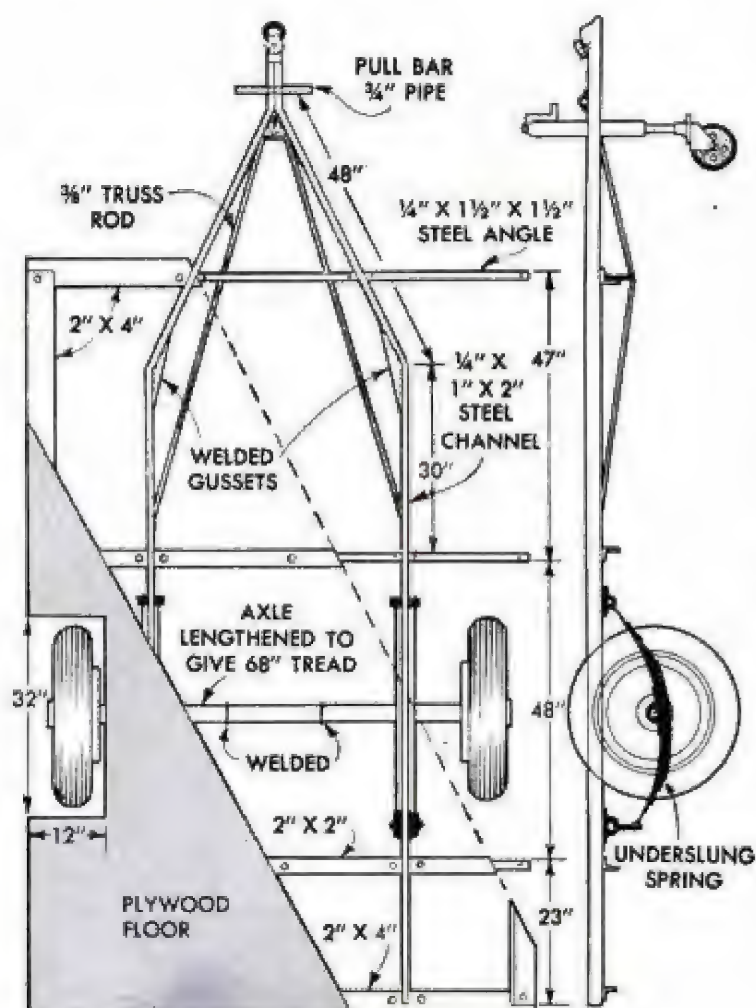




LEFT SIDE (INTERIOR)



RIGHT SIDE (INTERIOR)



triangular filler pieces for maximum strength. Note also the position of the truss rods which pass under the forward cross member. The ends of the rods are welded to the frame members and are bent over king posts to form individual trusses. This construction carries the load at the forward end without any tendency to springing or vibrating, which would cause the trailer to weave at high speeds.

Note in the chassis details at the left how a 2 x 4-in. subframe is bolted to the steel chassis frame. If you use an auto front axle it must be cut and a filler piece welded in to obtain a 68-in. wheel tread. A standard trailer axle is recommended. Mount the axle to center approximately 47 in. from the rear frame member, attach the wheels and fit a parking jack with small caster wheel on the drawbar so the chassis frame can be leveled. Cover the wooden members of the chassis framing with a 3/4-in. waterproof-plywood floor and plane the edges smooth and square. Added strength and rigidity will be gained if the plywood floor is glued to the wooden frame



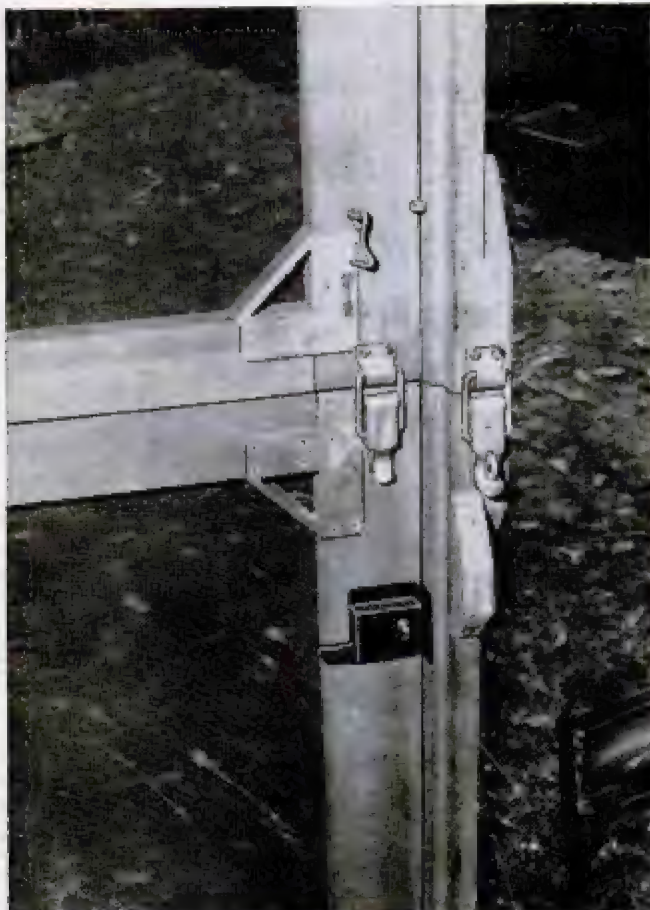
Fabric walls enclosing kitchen area are attached with grommets and turn buttons. Use heavy awning cloth



All set up at vacation, hunting or fishing camp, with cooking and sleeping accommodations for two persons

members with a waterproof glue and fastened with $1\frac{1}{2}$ -in. F.H. screws spaced about 4 in. apart. Next, assemble the sides as in the detail drawings on pages 188 and 189. These are assembled separately and then attached to the floor with heavy shelf brackets. Cross ribs, or "rafters," are put in after the sides are attached and braced temporarily in the vertical position. Now note in the center detail on the preceding

page, showing the right side, that the cross-hatched portion of the side measures 66 in. from the rear end. This establishes the hinge point of the curved deck. The latter raises and is supported on the folding screen-door frame as in the photos above and below. This gives standing room at the sink and stove. The area is enclosed with fabric walls made from heavy awning material as shown.



Probably the best method of making the sides is to lay out the profiles full-size on a single sheet of heavy wrapping paper made by taping together several widths to get the required size. Then cut the side panels from $\frac{1}{8}$ -in. hardboard. Assemble the frame members on the panel as detailed, cut them to fit, then glue and screw each piece to the panel. Note that the joints are strengthened with plywood gussets attached with glue and screws. Locate the openings for the door and window and cut away the panel. Add the top and bottom frame members for the window and the top member over the door opening. Then attach with shelf brackets to the plywood floor and brace temporarily in the upright position. Be sure that the sides are braced perpendicular to the bottom.

Locate and mark the hinge point of the curved deck on both sides. Some builders may wish to place the hinge point farther forward to gain more headroom at the refrigerator and sink. If you purchase sink, refrigerator and cabinets ready-made this may be advisable. In any case the center rib is located with its back face at the hinge point. Openings for the wheel housings can be cut into the side panels and the metal housings fitted in place. The housings are raised into position and the lips screwed to the floor. It's a good idea to coat edges of the plywood with a waterproof mastic before placing the housings. At this point cut four $\frac{3}{4}$ -in. plywood ribs for the deck. Cut the ribs 2 in. wide and about 2 in. longer than the measurement and to the same contour as the curved rear half of the sides. Some handwork will be necessary to assure a true fit at the front and rear where the sides join the floor. Keep in mind that waterproof glue is used in all joints in addition to screws.

The first forward rib is located approximately 15 in. from the floor. Now, before you go further, measure and cut the two covering pieces from $\frac{1}{8}$ -in. tempered hardboard, using 4 x 8-ft. panels. After cutting to the required width, allowing $1\frac{1}{8}$ -in. overhang on both sides and a 2-in. overlap at the joint, place the parts in position and locate the rib under the overlap. Glue and screw the rib in position. Two other ribs are installed equidistant between the three already in place. Now install the covering pieces, beginning with the front piece. Pre-fit this piece at the front edge, notching over the drawbar members and trimming the edge flush. Then spread glue, clamp in place and drive screws at the lower edge first. An exceptionally neat job of attaching the covering can be had by using oval-headed screws turned in over finishing washers. Otherwise use roundheaded screws spaced about 2 in. apart.



Space under studio couch provides for storage of a spare tire and also clothing and sporting equipment



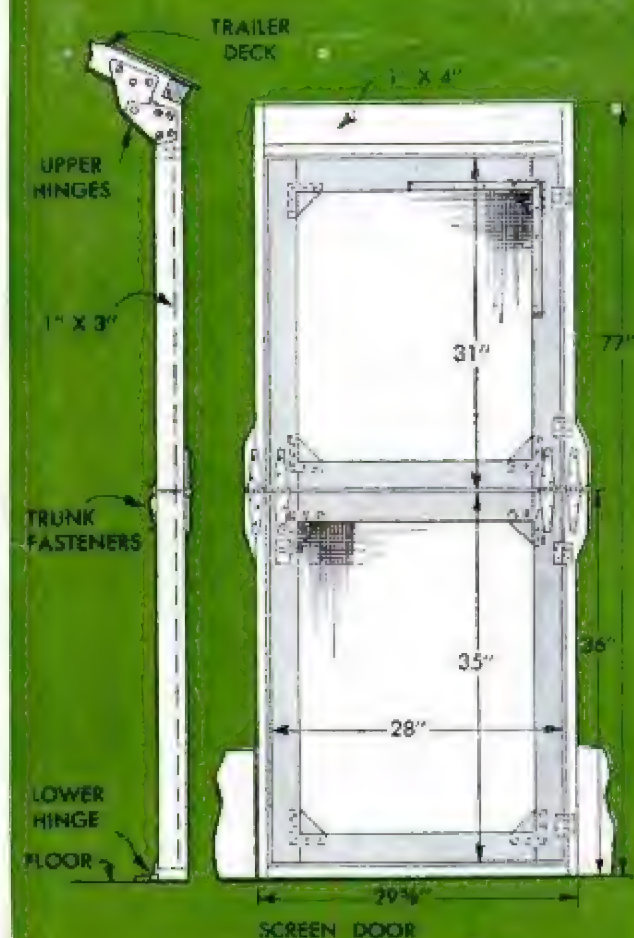
Above, there's ample space on the metal-topped cabinet for a camp stove. Below, refrigerator and sink cabinet with drop leaf occupy right wall of trailer



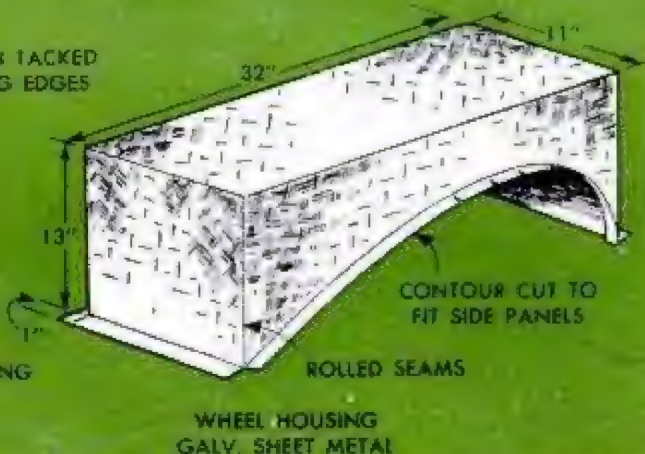


Now note in the upper and lower right-hand photos on page 190 the folding step and the fixed panels on each side. The side panels are approximately $11\frac{1}{2}$ in. high and are screwed and glued to 2 x 4-in. posts bandsawed to the contour of the trailer sides and screwed and glued to the bottom with the outer edges $\frac{7}{8}$ in. from the trailing edge of the floor. Space between the inner posts should be $29\frac{5}{8}$ in., which is the width of the doorframe. Fit $\frac{3}{4}$ x 12-in. plywood panels over the posts and attach with screws and glue. Cover the wooden panels with $\frac{1}{8}$ -in.-hardboard panels cut to extend down over the rear edge of the floor and floor supports. The step panel is cut from $\frac{3}{4}$ -in. plywood to fit between the posts and is hinged to the rear chassis member. The outer face of the hinged panel is covered with $\frac{1}{8}$ -in. hardboard extending $\frac{1}{2}$ in. at the top and ends. The original step was made by cutting, bending and welding $\frac{1}{8}$ -in. steel to form the unit pictured. It is attached to the hinged panel with screws.

At this stage the curved deck can be made and fitted in place. The ribs, which have already been cut, can now be fitted individually. Cross ribs are butt-joined to the outer curved ribs but are half-lapped over the center ribs. Join all ribs to a 2 x 2-in. cross member at the ends. Before covering with $\frac{1}{8}$ -in. hardboard, check the fit of the deck frame in the opening. It should fit snugly without binding at any point. Now attach the covering pieces, beginning at the forward end of the frame, in the same manner as those on the front of the trailer. Slide the edge of the second piece under the edge of the first one to form an overlap directly over the center cross rib. When driving the screws make sure that the hardboard does not buckle and that the overhang on each side is the same. Hinge the completed deck in place, using four butt hinges equally spaced across the width. Cover the joint with two thicknesses of waterproof canvas cut into 4-in. strips and tacked or screwed over the



SCREEN TACKED ALONG EDGES



joint. Spread calking compound under the first strip and fold the edges of both strips as they are tacked. Do not use glue as it may be necessary to renew the canvas covering after several seasons of service.

Details on page 188 show the clothes closet built into the forward end of the trailer body, also the storage cabinets on the right and left walls. The closet is of simple construction, and there can be some variation in the position of the parts. Sections A-A and B-B show how the sliding doors are fitted. Dimension and position the parts according to the space occupied by the studio couch you use for a bed. Cabinets are made from plywood with facing strips of solid stock. The design of the cabinets can be altered to suit the builder's requirements. Only a portion of the lower compartments can be used for storage, as the cabinets are built over the wheel housings. Ready-made unpainted cabinets can be adapted by removing the lower drawer, cutting away a portion of the back and fitting a hinged door over the drawer opening. Small iceboxes also are available.

Although a method of constructing a window with a plastic pane is detailed on the opposite page, it is recommended that a ready-made unit be purchased. The door in the right side of the trailer is framed with 1 x 2-in. stock and covered with $\frac{1}{8}$ -in. hardboard. The door is weather-stripped with felt and is made watertight with an aluminum T-molding and metal drip trough.

The two-piece screen door, detailed on the opposite page, supports the deck when in the upright position and is hinged to fold inward as the deck is lowered. When in the raised, or open, position the door opens as a single unit. The upper door-frame hinges, shown in the side view, are made from $\frac{1}{16}$ -in. flat-steel plates riveted together loosely for free movement and drilled for screws. Considerable hand fitting of the assembly will be required in order to assure free movement of the door and its folding frame. The door swings outward on four butt hinges as shown in the detail. The fabric walls enclosing the kitchen area when the deck is raised are cut to fit and are provided with equally spaced grommets for attachment to the deck and body as in the upper photos on page 190. If desired, an awning also can be provided as in one of the photos.

To finish, apply an undercoater and two coats of outdoor enamel. Joints in the body covering are concealed with aluminum moldings applied after finishing. Wire the trailer for a 110-volt lighting circuit for convenience in trailer courts. Use 6-volt screw-base bulbs for car-battery operation of lights. Provide clearance reflectors, tail-light and license-plate holder. ★ ★ ★

Pipe Used as Sanding Block For Scrollwork

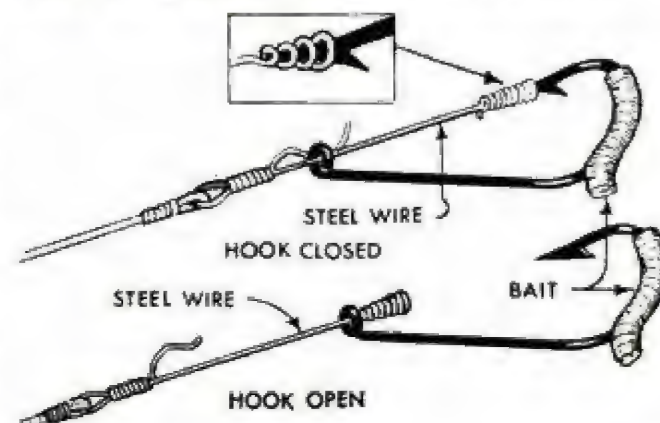


When sanding the edge of an inside curve or circle, the work goes much faster and easier if the sandpaper is wrapped around a piece of pipe about 6 in. long. The diameter of the pipe will depend on the radius of the curve to be sanded. Using the pipe also helps to keep the sandpaper square with the work.

Robert A. Hicks, Garden City, N. Y.

Fishhook Has Sliding Wire Guard To Prevent Snagging on Weeds

A short length of thin, spring-steel wire is all you will need to convert a common fishhook into a weedless type. After bending the eye of the fishhook slightly inward, secure one end of the wire to the fishline, pass the other end through the eye and coil to fit over the point as shown. When finished, the wire should be just long enough to allow the leftover strand where connected to the line to be slipped through the eye and bent up as shown to hold the coil over the point. In use, a quick yank on the line as soon as any tugging is felt overcomes the wire catch and pulls the coil from the point inside the fish's mouth.

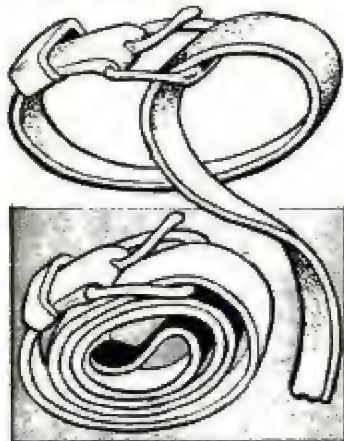


Pins on Paper Easy to Locate If Taped Around Bottle



Dressmakers, tailors, window trimmers and others who regularly require a supply of pins close at hand during their work, will find that a paper strip of the pins taped around a bottle in the manner shown is a valuable timesaver. Easily visible, the bottle is less likely to be misplaced or covered with other materials being used near by.

Belt Coiled Inside Itself For Storing or Packing



It's easy to coil a belt into a compact roll that will not unroll when stored or packed in luggage. Simply insert the end of the belt through the buckle as shown, leaving a large loop. Next, roll the free end back toward the buckle and push the resulting coil inside the loop. Then, holding the loop in one hand, twist the coil with the fingers of the other hand until it is tight and the loop itself tightens around it. To release the roll, twist the coil in the opposite direction to that in which it was rolled.—James K. Hufft, St. Louis, Mo.

Paintbrush Gives Longer Service When Properly Broken In

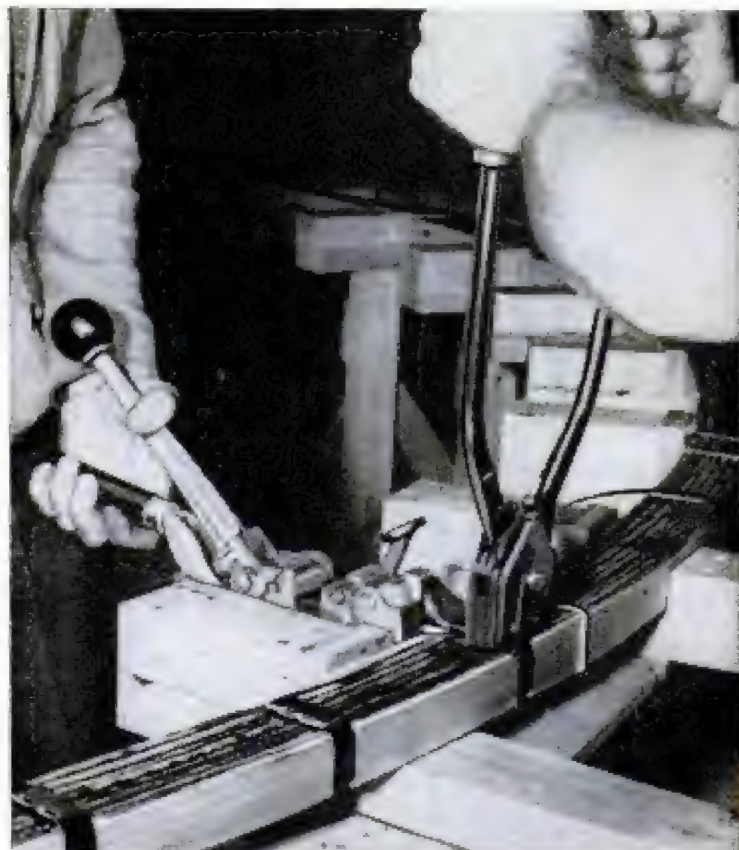
To give longer, more satisfactory service, a new paintbrush should be properly broken in. A preliminary 48 to 72-hr. soaking in raw linseed oil will saturate the porous bristles and prevent paint pigments or gums from becoming cemented within the bristles. After this oil bath, the bristles should be laid perfectly straight and wrapped in heavy paper. Just before use, unwrap the brush, wipe out the surplus oil and spin the brush over a large receptacle. This done, comb the bristles straight. Following this breaking in, you'll find that in addition to making the brush last a whole lot longer, you'll have a very flexible brush that is easy to use and easy to clean after the job is done.

Laminating ARCHED RAFTERS

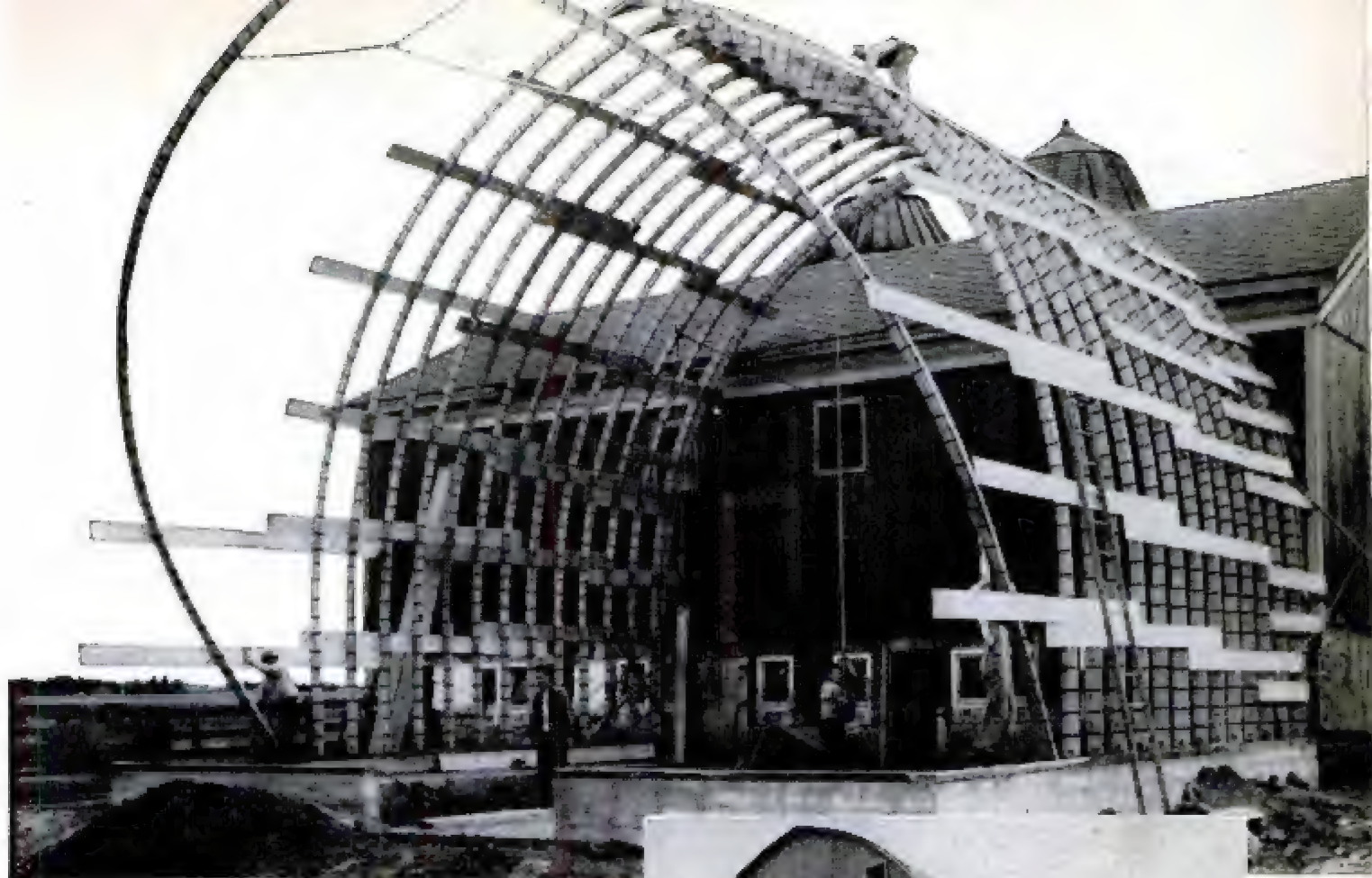
By F. A. Strenge

EXPERIMENTAL work carried out by D. V. Doyle, of Forest Products Laboratory, has resulted in the development of a new and simple method of laminating curved rafters right at the building site. The method promises to save valuable time in the construction of farm buildings, stores and other small frame structures on which the curved roof is desirable because of its resistance to wind pressures and damaging snow loads. The secret of the speed with which the rafters can be assembled is in the use of steel strapping as a means of clamping the bent strips after gluing. This is ordinary steel box strapping applied with a strapping machine as in the photo below. On rafters built up from 1 x 2-in. strips, the straps are placed about 12 in. apart.

The first step in building the rafters is



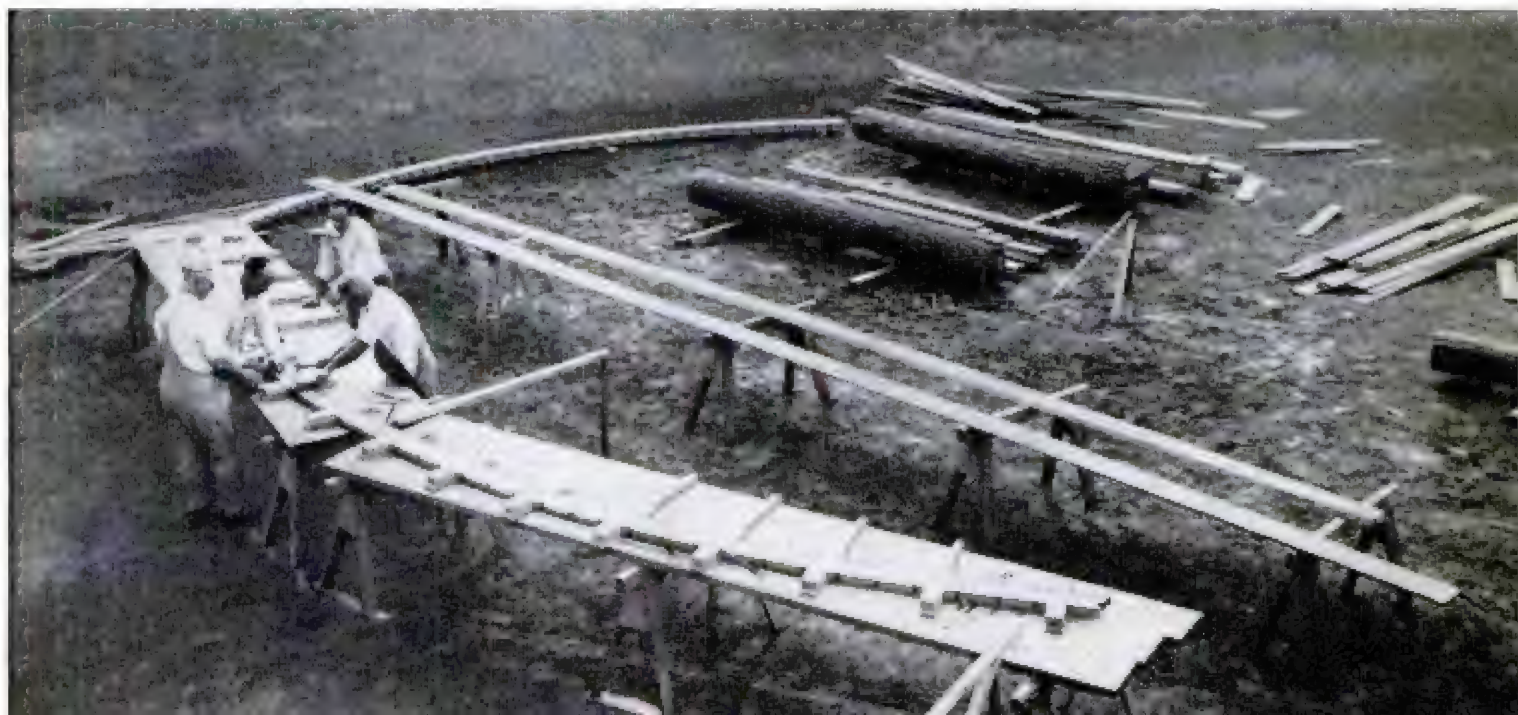
Speedy clamping of curved rafters in the bending jig is made possible by use of steel box strapping



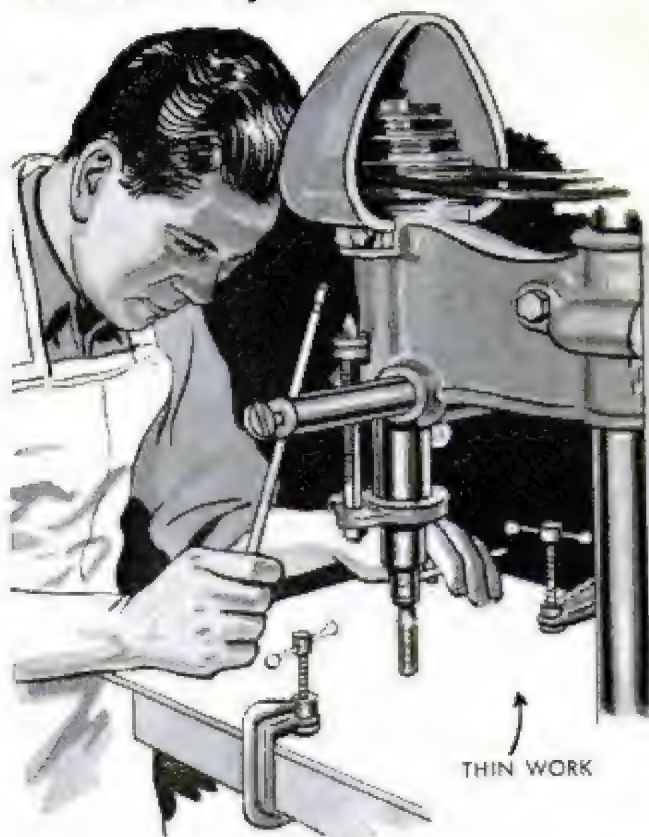
to construct a bending or forming jig by nailing planks to sawhorses placed on a radius equal to that of the rafter. The sawhorses must be beveled and braced to prevent movement under bending stress of the rafters. Then the radius and outline of the rafter are marked on the top of the planks, and stop blocks are spaced and nailed with their ends on the radial lines. This gives you the setup shown in the photo below. Next, 1 x 2-in. strips are sandwiched edge up between the forming blocks with a film of waterproof glue spread on all meeting faces. When the strips are in place they are strapped tightly at 12-in. intervals. ★ ★ ★



Above, rafters are joined at the ridge with hardwood gussets glued and bolted in place before unit is hoisted into position. Below, rafter being built up in the jig



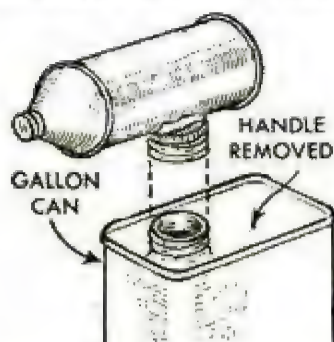
Tapping or Reaming of Thin Work Started Easily in Drill Press



To overcome the difficulty of starting a tap or reamer straight in thin work, one craftsman clamps the work to his drill-press table, inserts the tool in the spindle sleeve and, after removing the belt, rotates it by means of a pin inserted in a hole in the sleeve as shown. Another way of doing this is to chuck the tool and rotate it by turning the chuck by hand.

Frank M. Butrick, Alma, Mich.

Gasoline Can Has Attached Funnel



A gasoline can that carries its own funnel can be made from any gallon thinner or brake-fluid can which has a metal screw cap. The cap is soldered to the side of a beverage can of the type shown and the bottom of the beverage can is removed with a can opener, preferably one of the rotary type. In this way, you always have a funnel at hand.—Howard J. Schweitzer, South Milwaukee, Wis.

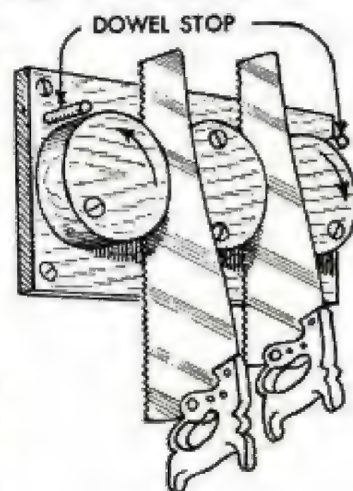
Round File Used as Reamer

To enlarge a hole in a washer or piece of thin metal, use a round file that is larger in diameter at the handle end than the hole desired. First, chuck the tang of

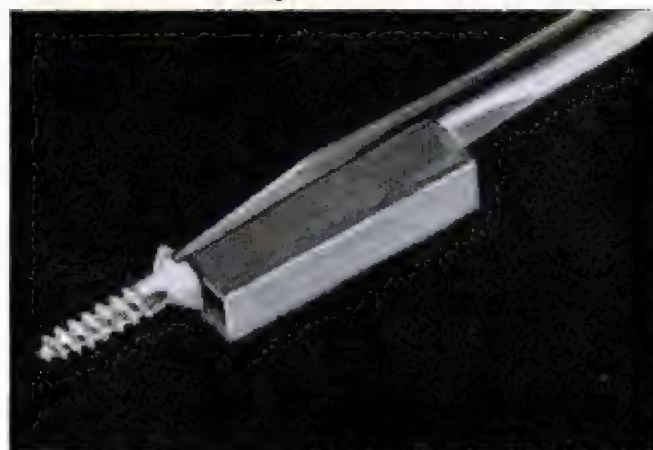
the file in a brace and then rotate it counter-clockwise in the hole, turning with light pressure until the desired size has been reached.—N. C. Darling, Orleans, Mass.

Hanger for Storing Handsaws

A convenient method for storing handsaws in the workshop so they are ready for use, and at the same time are protected from dulling contact with other tools, is provided by this unusual saw hanger. Three hardwood disks are attached to a backboard as shown in the diagram, one being stationary and the other two pivoted off-center. The weight of the saw tends to pull the pivoted disk tight, thus gripping the saw. The grip of the disks on the saw can be improved by wrapping them with friction tape or other nonslip material.—J. R. Hicks, Centralia, Mo.



Bar Magnet on Screwdriver Blade Permits Driving With One Hand



Here's a kink for holding a flat-head screw on a screwdriver blade so it can be driven with one hand. All that's needed is a small bar magnet which is placed against the side of the blade in the manner shown. The magnet clings to the blade while at the same time holding the screw slot over the tip of the blade for driving.

John J. Rea, Urbana, Ill.

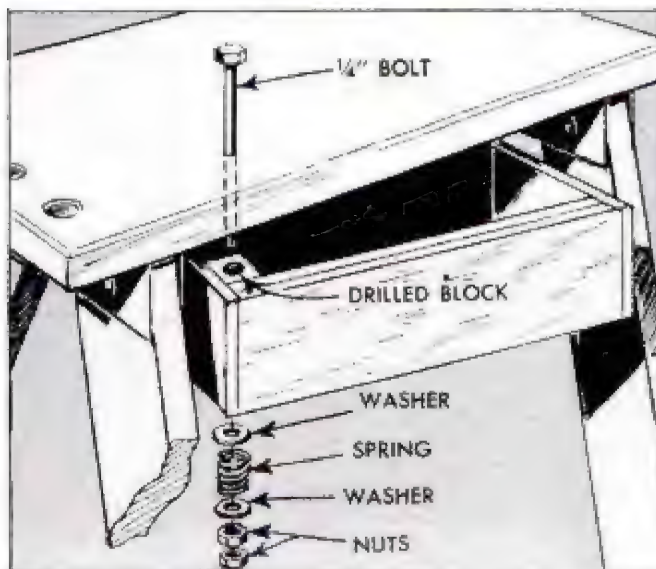
☞ A package of old photo negatives placed in your fishing or hunting kit will come in handy for starting fires. Placed under small twigs and ignited, they give a hot, steady flame just long enough to get the fire going.

STEPLADDER STEP-SAVERS

By Walter E. Burton

WHY GO UP and down, up and down on your stepladder while doing repair work, when a few additions to the ladder can save you the extra steps? For example, a pivoted drawer that swings under the ladder top will hold all sorts of objects, and paint cans placed in it are not likely to spill. The drawer should be just wide enough to swing without binding against the ladder leg. A hardwood block glued into one corner is drilled to receive a $\frac{1}{4}$ -in. bolt on which the drawer pivots. A small compression spring between washers on the bolt holds the drawer tightly against the ladder top, and a stop block of wood under the top limits drawer movement. Another handy kink is to bore $\frac{1}{2}$ -in. holes 1 in. apart near the ends of the ladder top for screwdrivers, pliers and other small tools. Finally, as a safety measure and to reduce marring of floors, the ladder legs should be equipped with shoes. Rubber or leather belting is folded around the bottoms of the legs and nailed in place.

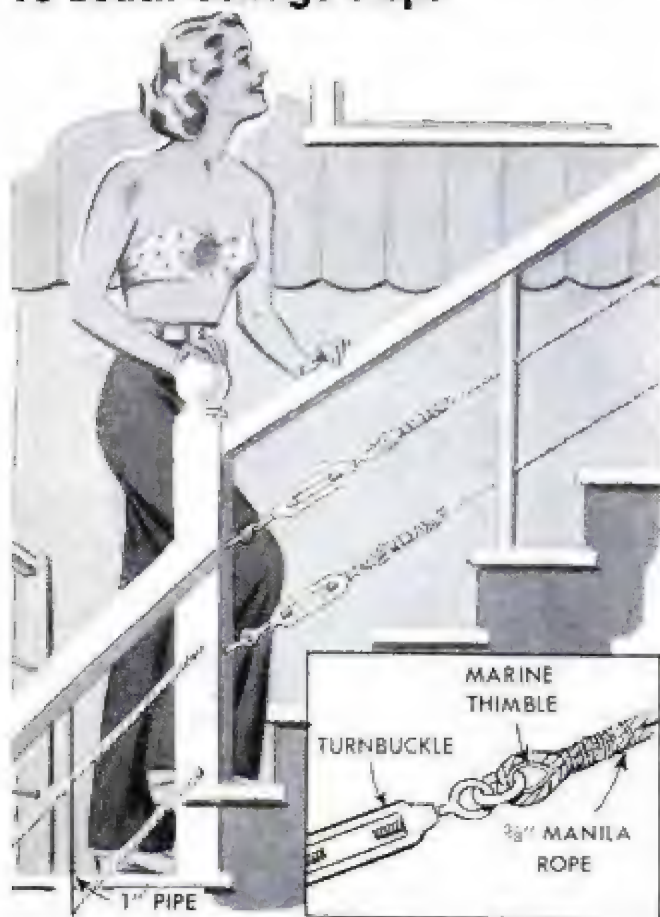
Below, width of pivoted drawer is same as width of ladder top. Lower right-hand photo shows drawer in working position, holding paint can and tools handy



Above, holes drilled in ends of ladder top to hold small tools. Below, shoes of rubber belting with the corners trimmed nailed to bottom of ladder legs



Rope Rail Adds Nautical Touch To Beach-Cottage Steps



This rope rail will add an appropriate nautical touch to the steps of any beach cottage. The rail is made of $\frac{3}{8}$ -in. manila rope wrapped around a marine thimble and seized to the standing part with wire. A turnbuckle is used at one end of each rope, both for the nautical effect and as a means of keeping the rope taut. The center posts of the stair railing are 1-in. pipes, drilled so that the rope can pass through them. Hi Sibley, Nuevo, Calif.

Specially Rigged Line Fools Carp With Sliding Sinker Arrangement



First, thread a sinker onto the line and then tie a small metal ring—just large enough to prevent its passing through the eye of the sinker—to the end of the line. Now tie the end of a leader or a short length of string to the ring and attach a hook to the other end. This arrangement usually fools the carp which, in most cases, spits out the bait the moment he detects the resistance

Fishermen who fail to land the crafty, large carp when using sinkers on their lines, will enjoy greater success with the use of this specially rigged line.

offered by a conventional fixed sinker. The specially rigged line, on the other hand, will allow him to take the bait in his mouth and make a run for it before detecting any resistance but, by then, the hook has had a good chance to become well set.

Willard Benner, Souderton, Pa.

Convenient Holder for Power Tool Provided by Coffeemaker Handle

The handle from a broken coffee-maker, will provide the craftsman with a convenient handle or bracket for holding a small, hand power tool in almost any position desired, while at the same time leaving both hands free for manipulating the work. The handle may be held in a vise or, after a hole has been drilled in the end, fitted with a dowel for insertion in holes drilled at various angles in a wooden block to regulate the position of the unit.



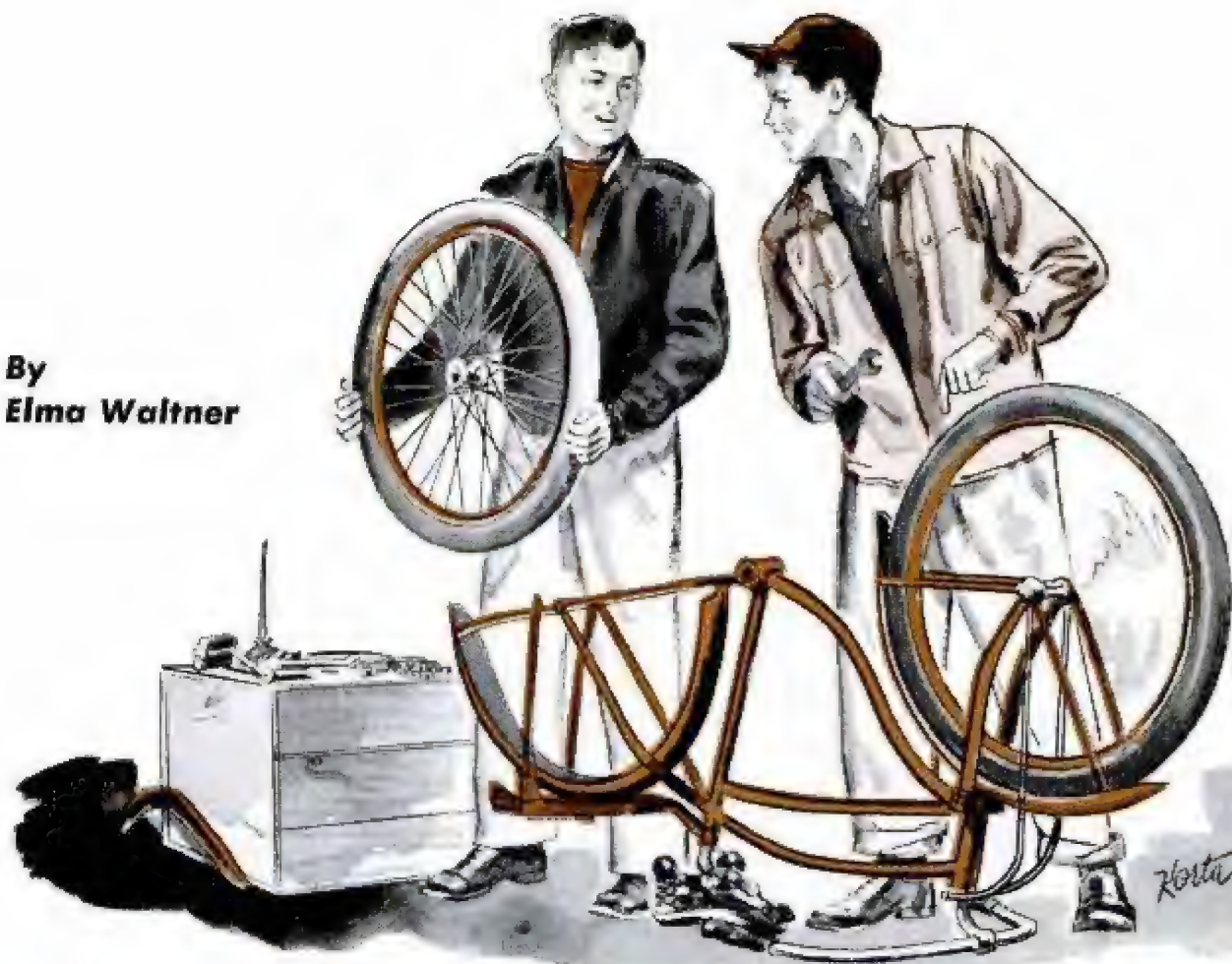
Beeswax for Lubricating Screws Carried in Altered Fuses

A last-minute search for soap or wax scraps to aid in driving screws or nails won't be necessary if you keep a small quantity of beeswax stored in each jar or can of small parts. Small containers that are just right for the wax can be made from burned-out 15-amp. fuses by removing the centers and filling them with melted beeswax. In use, the point of a screw or nail is dipped into the beeswax as indicated.—Benj. Nielsen, Aurora, Neb.



When soiled combs and brushes are soaked in a detergent for 10 min., the dirt softens and comes out easily.

By
Elma Waltner



OVERHAUL Your Bike

REGULAR OVERHAUL and replacement of worn parts not only keeps your bike in tiptop mechanical condition, but clean, well-lubricated bearings, properly inflated tires and correct wheel tension reduce bearing and road friction to the minimum. That's something to think about when there's a long hill on the paper route or on the way home from school.

If there is any looseness in the fork assembly it's a good idea to remove it and check the head bearing

Before inverting the bike to go over the wheel and crank bearings and the chain, check the handle bars and the fork stem. If there is looseness in the parts it's a good idea to remove the fork and examine the head bearing. If the bearing shows appreciable wear it should be replaced. Complete head-repair sets are available for this purpose. While you have these parts down,

To remove fork, first take off handle bars, then unscrew locknut and remove the cone and keyed washer

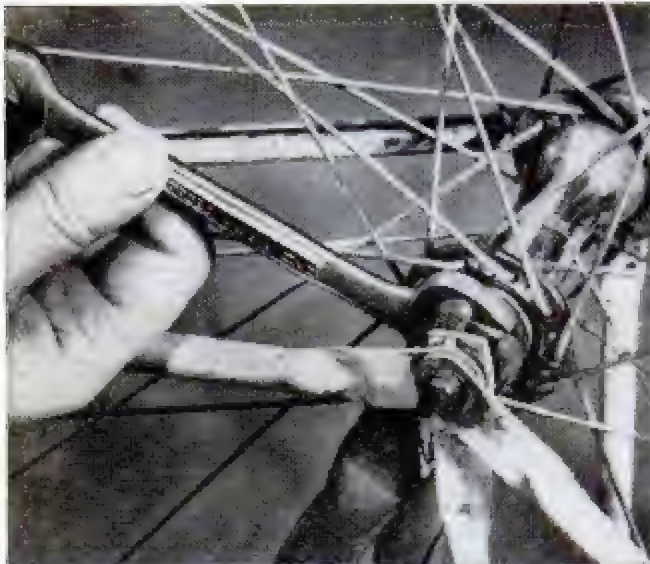


remove the front wheel by unscrewing the spindle nut and sliding the wheel out of the slotted fork. To disassemble the bearing, unscrew the adjusting cone and slide the spindle assembly out of the hub. Clean the parts thoroughly in a nonflammable solvent or kerosene. Relubricate the bearing and reassemble in the wheel hub.

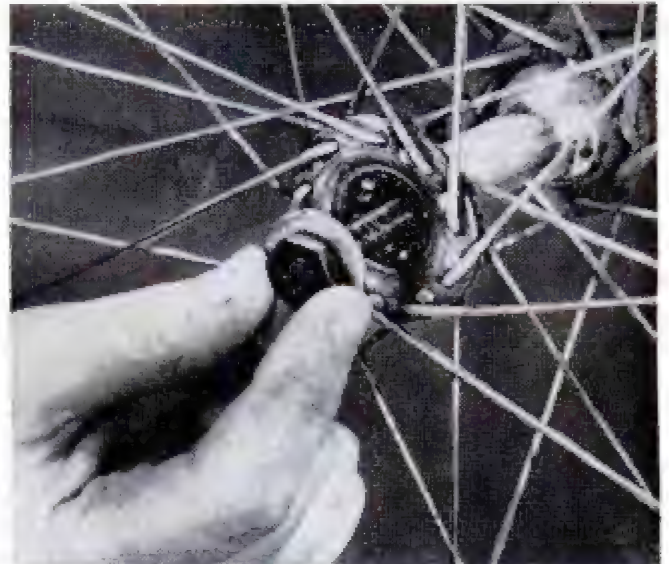
Now invert the bike and remove the drive chain by loosening the master link. Then remove the rear wheel by first taking out the bolt which holds the brake-arm clamp. Although close attention must be given to proper procedure, it is not difficult to remove and reassemble the coaster brake. Be careful to keep the parts in order as they are removed and cleaned. Lubricate according to the manufacturer's instructions and reassemble. To gain access to the pedal-crank bearings, remove the pedal on the side opposite the sprocket, then unscrew the locknut and remove the keyed washer. The slotted cone can be backed

out with a screwdriver or with a special spanner wrench. This releases the crank assembly so that it may slide out of the housing. Clean the parts, making sure that you keep them in order so they may be reassembled properly. If individual bearing balls show pitting or undue wear it is advisable to replace the entire cluster, or set, rather than the single ball. This also is true of wheel bearings. When reassembling wheel and crank bearings, tighten the adjusting cones only to the point where the spindle turns freely without play.

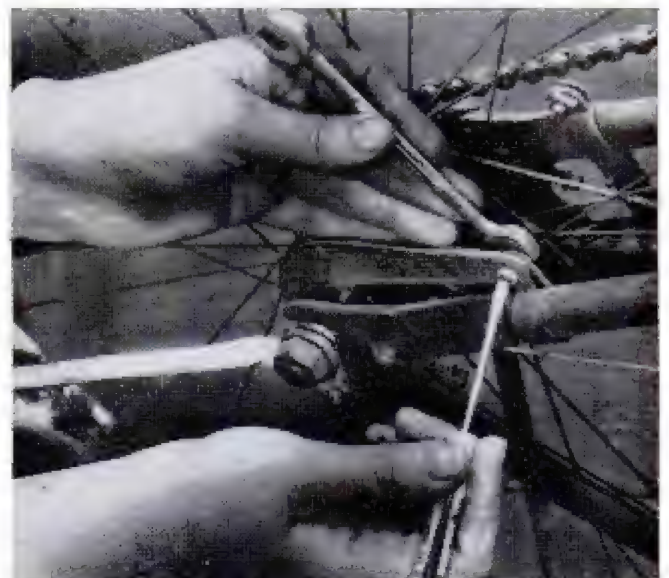
Clean the roller chain in a solvent and check carefully for worn links. Replace any links or rollers which show excessive wear or pitting. After the chain is replaced on the sprocket, adjust the tension to about $\frac{1}{2}$ -in. sag. Adjust the spokes of both wheels to a uniform tension with a spoke wrench. Reassemble the handle bars and adjust both bars and seat to a comfortable height. ★ ★ ★



Above, after reassembling the wheel bearing, tighten adjusting cone just sufficiently to take out all end play, yet permit wheel to turn freely. Below, adjust wheel tension with spoke wrench, drawing spokes to a uniform tension. Be sure the wheel rim is true

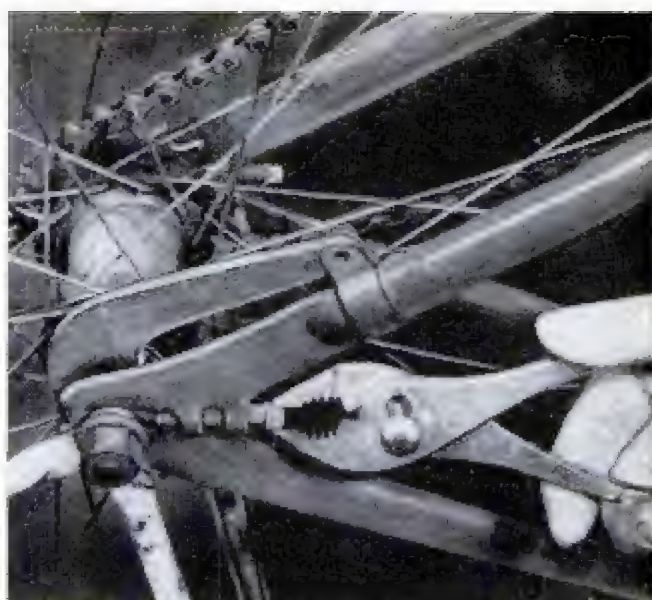


Above, withdraw spindle bolt carefully so that bearings do not drop out. Keep the parts in order so that they are easily reassembled. Below, before spindle nut is loosened remove bolt holding the brake-arm clamp. Then release the chain-tension screws





Special repair kits are available for replacing worn parts of the drive chain. Rollers and links which show excessive wear or rust pits should be replaced



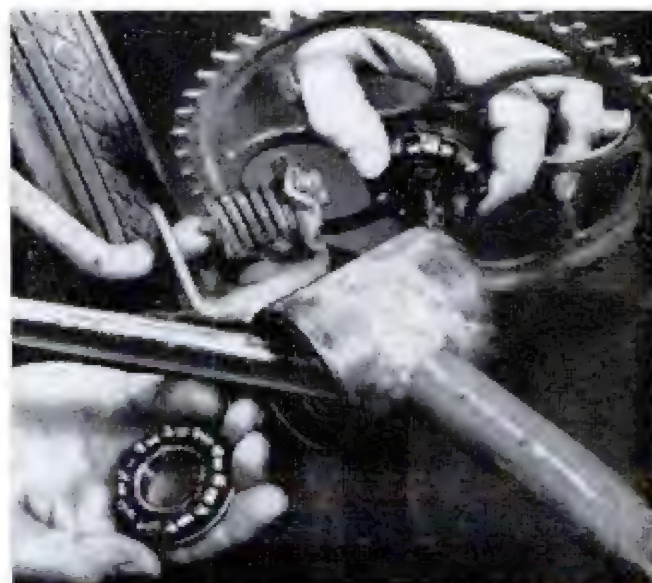
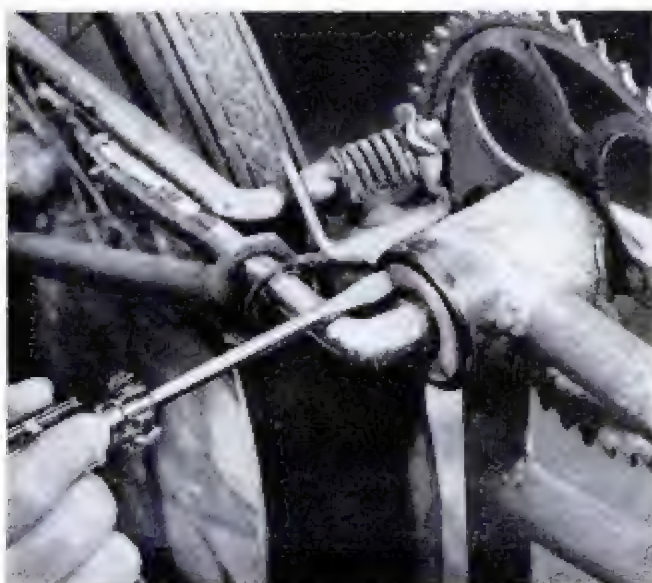
After cleaning and reassembling drive chain, the tension is adjusted by turning in the tension-adjusting screws. Ordinarily chain is adjusted to $\frac{1}{2}$ -in. sag



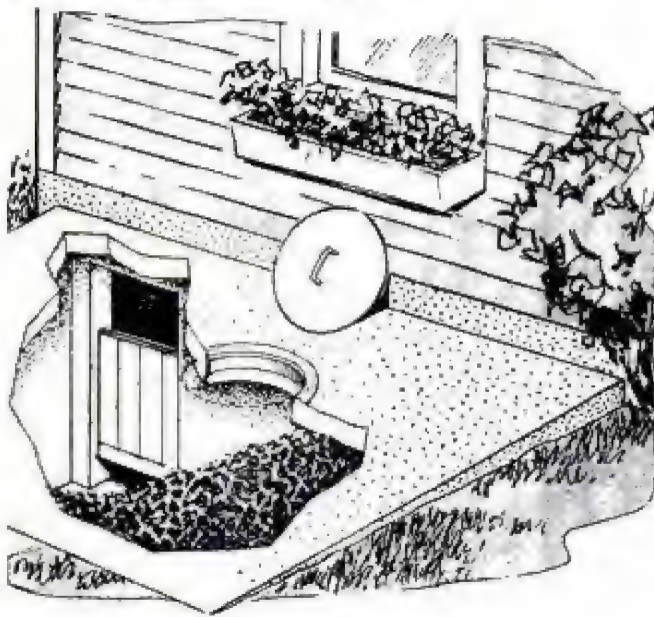
Above, remove pedal opposite sprocket as first step in disassembling crank bearing. Then unscrew the lock nut and pull off keyed washer. Slotted adjusting cone is removed with a screwdriver as shown below, or with a spanner wrench supplied for the purpose



Above, as a final part of service checkup tighten saddle bolts to uniform tension. Below, final step in disassembly of crank bearing. Note that one bearing is being held in the left hand while crank is passed through housing. Clean these parts thoroughly



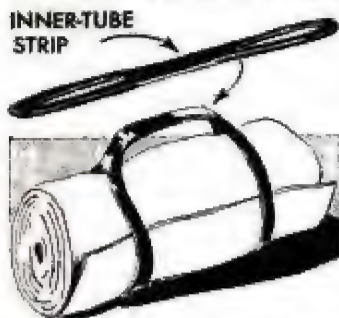
Coalbin Outside Foundation Saves Basement Space



Built of reinforced concrete outside the basement wall of a house, this coalbin not only saves space but also eliminates much of the uncleanness of a wooden bin erected indoors. A door opening cut in the foundation opposite the furnace is fitted with a removable wooden bulkhead that is open at the bottom to permit removal of coal piled high in the bin. The concrete covering the bin is sloped slightly to drain rainwater, while a hole covered by a steel lid is provided for supplying the bin. Furnace cement is applied around the edge of the lid to seal it against the weather.

A. M. Wettach, Mt. Pleasant, Iowa.

Rubber Strip Provides Handle On Camper's Blanket Roll



Campers find that a slotted strip cut from an inner tube makes a convenient handle for carrying their blanket rolls. A slit is cut in each end of the strip just long enough to fit snugly over the rolled blanket. The width of the rubber strip will depend on the weight of the blankets, a wider strip being needed to support a larger roll.

Matches Used to Boost Heat Of Electric Soldering Iron

Occasionally I find that heat from a very small electric soldering iron is insufficient for the job at hand. This usually occurs when the iron is too small, when only low voltage is available or when the iron is

used outdoors in the cold. In most cases, I am able to overcome these handicaps by periodically holding two or three lighted matches under the copper point just back of the tip to supply the necessary boost in heat.—Mrs. T. F. Watts, Charlotte, N. C.

Pipe Cap Directs Gasoline Into Blowtorch Pan

To speed filling the generating pan of a blowtorch, which usually is accomplished by opening the valve of the burner just enough to allow the gasoline to trickle into the pan, place a large pipe cap over the nozzle of the torch.

This will deflect the gasoline into the pan when the valve is opened wide, filling it in a matter of seconds. The pipe cap may be carried in the tool kit if desired.



Pencil-Type Eraser Drilled in End Holds Pencil Stubs for Writing

Pencil stubs that are too short for practical use can be saved and used if they are inserted in the end of a pencil-type eraser. Ream out the end of the eraser with a 1/4-in. drill to a depth of about 3/8 in. Break off the metal ferrule of the pencil and insert it in the prepared hole. Since an eraser of this type ordinarily outlasts the pencil stub, a number of stubs can be used in the same eraser. Also, this arrangement makes it possible for the eraser itself to be used down to its end conveniently.



■ Ink stains can be removed from wall-paper by using a solution consisting of equal parts of household ammonia and hydrogen peroxide.

STOLEN-

\$19,000,000

By Ed Packer



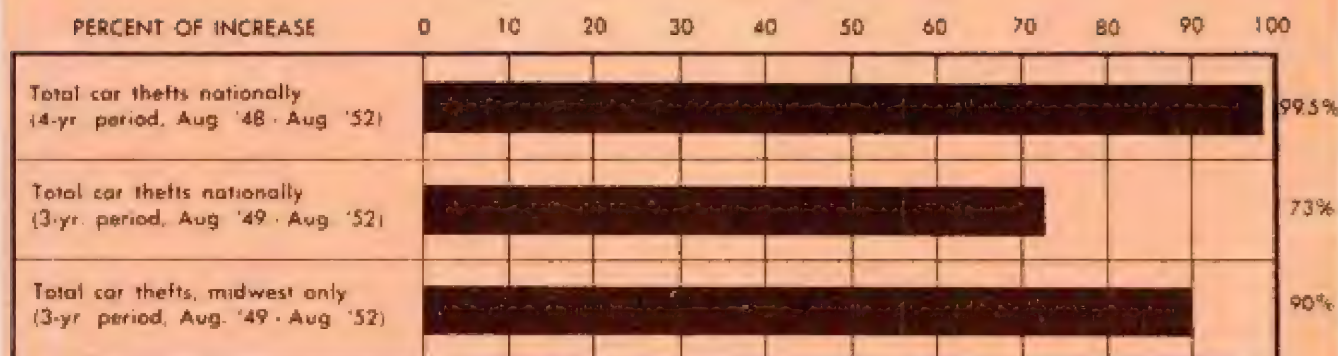
YOUR CAR could be one of an estimated 200,000 automobiles expected to be stolen this year—it might even be one of the 19,000 which will disappear completely, never to be recovered. This total loss amounts to almost \$19,000,000, but still it is only 9.5 percent of the staggering \$200,000,000 worth of cars stolen annually.

Most of the cars stolen are those parked with the keys in the ignition. The owners of these cars, guilty of negligence in the theft of their own autos, may be held ac-

countable for further crimes or damage resulting from the use of their cars. J. Edgar Hoover, Director of the Federal Bureau of Investigation, urges all motorists to take the following precautions when leaving their cars: Lock both ignition and doors; whenever possible avoid parking in unlighted areas or overnight on the street; check the safety of your parked car periodically; do not leave any article of value in a parked car visible to passers-by.

No amount of care, however, will stop

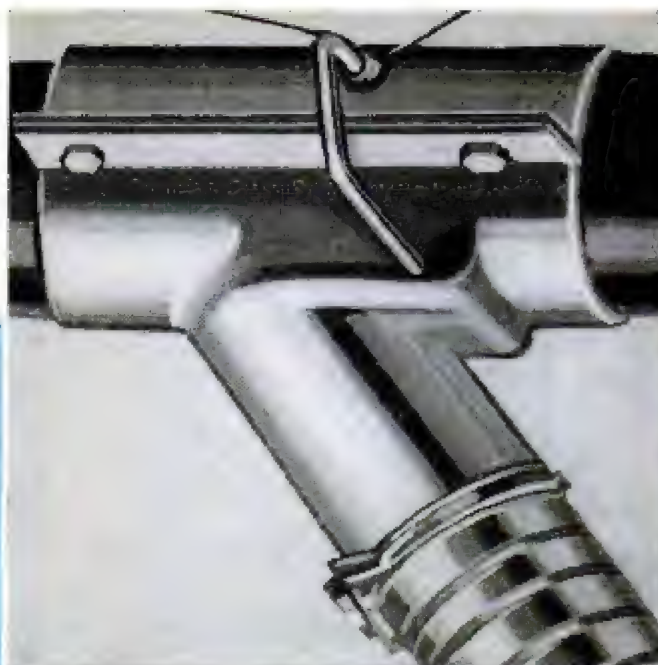
CURRENT AUTOMOBILE-THEFT STATISTICS



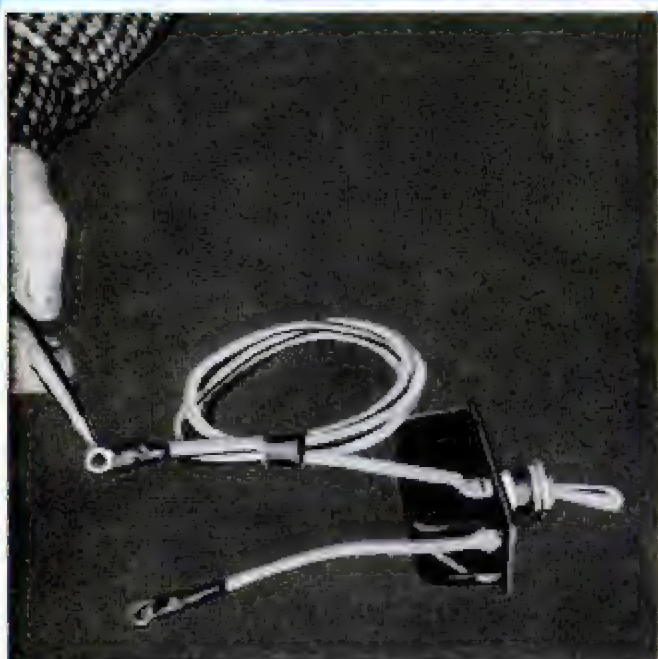
During the 4-yr. period from August 1948 to August 1952, the percentage of stolen cars recovered increased from 89.4 to 90.5. Thus, 9.5 percent of the 200,000 automobiles stolen annually cannot be found. Allowing an average value of \$1000 per car, this means that about \$19,000,000 is lost each year.



One end of chain attached to a lever behind the instrument panel allows the driver to bring this bicycle siren into contact with the fan belt when he parks his car. Releasing lever stops the siren



Control wire which opens exhaust-cutout valve can be brought under instrument panel, front seat or other inconspicuous place. The thief won't take time to find cause of thundering exhaust



By attaching lead indicated by pencil to distributor terminal and grounding short lead, this switch can be opened to make the distributor inoperative. The switch is concealed in the car



Manifold air bleed is best installed by removing manifold and turning 1/2-in. pipe elbow into tapped hole on underside. Length of 1/2-in. hose leads from elbow to valve under the instrument panel

car thefts entirely; however, by being cautious and making it difficult to steal your car, chances are that yours won't become part of the auto-theft statistics.

The mechanical devices pictured here help protect your car in two ways—some of them make the car difficult to start or drive away and others, which are even more effective, draw attention to the thief. An ordinary bicycle siren, brought into contact with the fan belt when the car is parked, not only attracts attention as soon

as the engine is started but sounds to the thief like an approaching police siren.

Because it's illegal in most areas and does an excellent job of making the car conspicuous, an exhaust cutout will make the thief decide quickly that yours is not the car for him. The valve control for the cutout can be located anywhere in the car.

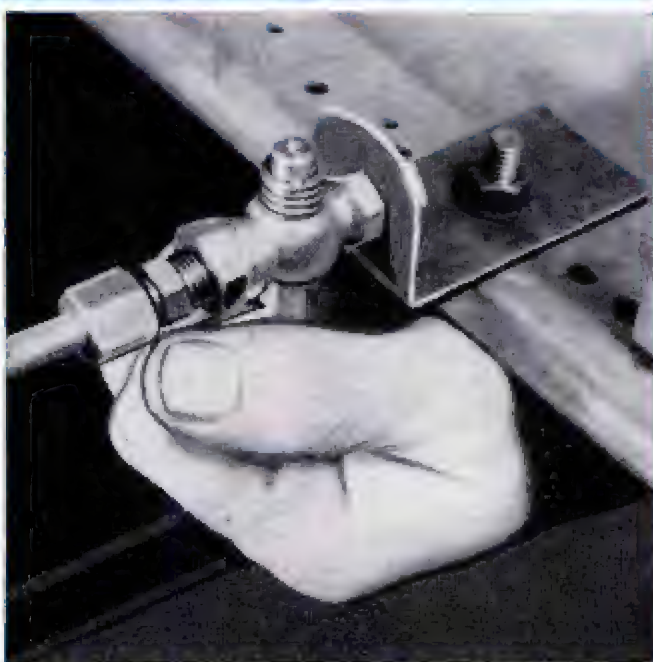
As most car thieves ignore the ignition switch and use a jumper, an auxiliary switch wired in series with the regular ignition switch is not especially effective.



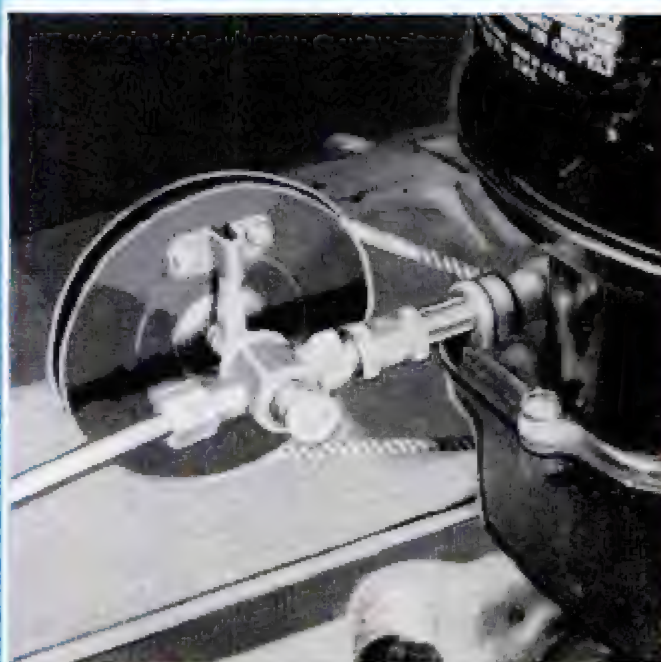
Simple shutoff valve fastened to back of instrument panel is opened to feed air into manifold and prevent starting car. Length of hose connects valve with the pipe elbow shown on opposite page



Air bleed can be installed on intake side of fuel pump by running tubing from fuel line to shutoff valve. T-fitting and valve are pictured above, valve normally is located as shown below, left



Bracket bolted to instrument panel holds shutoff valve for fuel-pump air bleed out of sight. It is possible to install several of these valves so that opening any one of them will stop car



Pulley-and-cable arrangement permits driver to shut off fuel supply after parking his car. Pulling one of the cables closes valve in carburetor fuel line while pulling other cable opens it

However, if one of the auxiliary switch leads is attached to the distributor terminal and the other lead grounded, the switch can be used to "kill" the action of the distributor and a jumper will not start the car. The switch leads are concealed by taping them to the regular car wiring.

A manifold bleed will prevent starting the engine when the valve is open and usually baffles the thief completely. A pipe elbow can be inserted in the manifold on the underside where it cannot be seen, and

the valve may be located under the instrument panel.

An air bleed on the intake side of the fuel pump is also effective in that it will only allow the car to be driven a block or two. The one disadvantage is that the thief may be able to drive the car to a location where he can work on it with less chance of detection. A similar type of device can be made by inserting a shutoff valve in the carburetor fuel line. Valve-control cables are extended to the instrument panel. ★ ★ ★



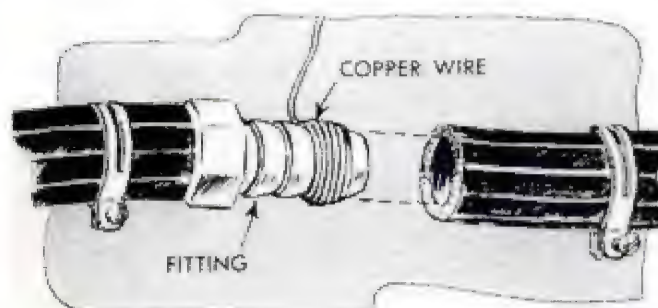
Waste Space in Deep Drawer Accommodates Sliding Tray

To make use of the upper part of a deep drawer for storing small articles, fit it with a tray that slides on wooden strips nailed or screwed to the sides of the drawer. In providing the tray illustrated, a cigar box with its cover removed simply was covered with bright-colored paper. Larger trays can be assembled from $\frac{1}{4}$ -in. plywood.

Connector Fitting for Tubing Enlarged by Turns of Wire

When rubber tubing is too large to be clamped properly over a serrated connector fitting of the type shown, wrap one or more turns of light copper wire around each of the serrations and solder in place. This will serve to increase the diameter of the fitting while at the same time retaining the ridges necessary for clamping the hose securely.

Hugh Lineback, Stillwater, Okla.

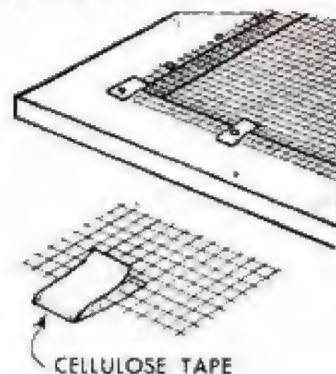


Go Up in the Attic . . .

for additional living space by installing dormers in your home. If you need a sewing room, den, playroom or extra bedrooms, don't miss the story next month that tells how to install every type of dormer to utilize waste space in your attic

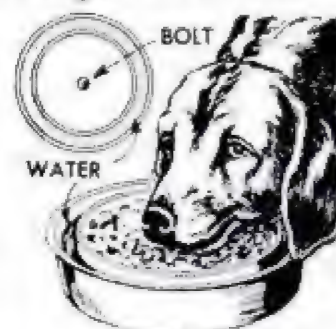
Retacking Frayed Screen Wire

When the screen wire of a door or window pulls away from the frame, it is often frayed to such an extent that tacks will not hold it again. In such instances, strips of cellulose tape that are folded over the edge of the screen to form tabs as shown, will hold the screen in place when tacked to the frame. If tape is unobtainable, tack thin, narrow strips of wood over the frayed areas.



Making Antproof Dog-Food Dish

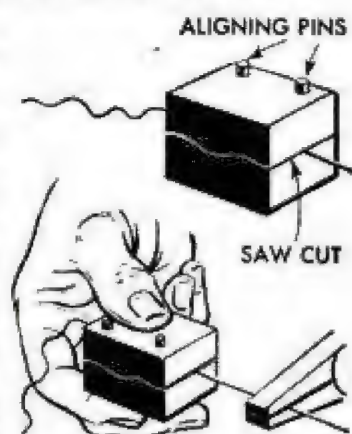
One kennel owner solved the problem of keeping ants out of the dogs' feed by using this special dish. Two pans, one an inch larger in diameter than the other, were bolted together to create a "moat" around the food. Filled with water, the moat effectively keeps ants out of the food. Aluminum pans must be bolted or riveted, but other types can be soldered. Use roofing compound around the bolt to prevent leaks.



Jig to Straighten Kinked Wire

To remove the kinks from any small-gauge, malleable wire, such as furnace wire, use a jig made from a small hardwood block. Cut the block in halves, making a wavy saw cut as in the detail. Then drill the blocks for aligning pins. To use, open the blocks, insert the wire and grasp the blocks firmly in one hand while pulling the wire through with the other.

Leonard H. Lundberg, Marquette, Mich.

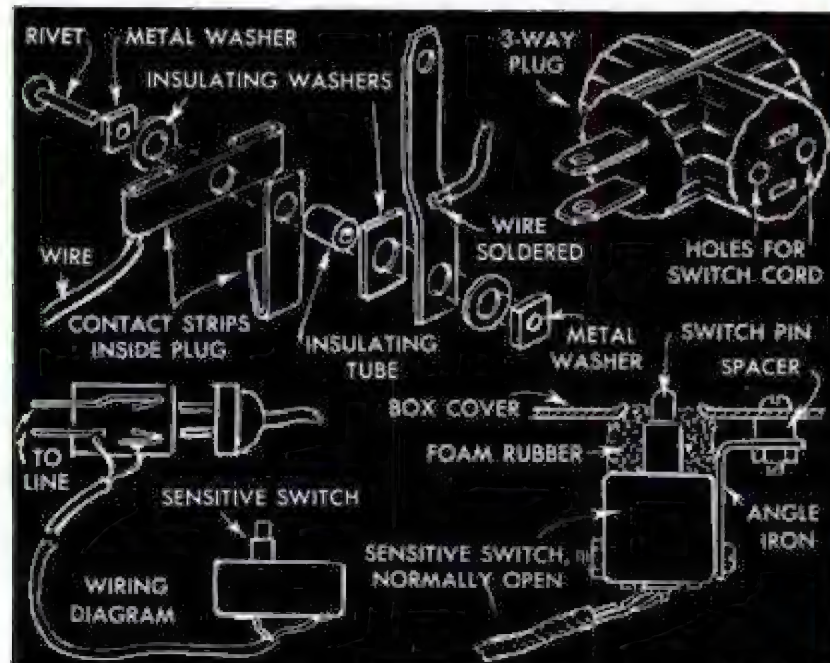


Modelmakers and hobbyists who require tiny washers for their work can make them easily by snipping them from the end of the plastic siphon tube of an underarm-deodorant bottle.

Plug-in Foot Control Switch

By Walter E. Burton

OPERATED BY a mere feather touch of the foot, this sensitive plug-in switch will be found handy for controlling a photo enlarger, a workshop power tool or other electrical appliance. The parts required are standard electrical items and include a 4-in. octagonal outlet box with a pendant cover, a non-metallic cable connector, a sensitive switch of the normally open type having a $\frac{3}{32}$ -in. pin, a three-way plug and a few feet of rubber-covered cord. Take the three-way plug apart by removing the bolt. Inside you will find two cross-shaped contact assemblies, each one consisting of two spring-contact strips riveted to the prongs. The spring strips are removed from one prong by filing the rivet and then the holes in both the prong and the strips are enlarged to receive a short length of $\frac{1}{8}$ -in. fiber tubing which is used to insulate the contacts from the prongs. Insulating washers fit over the tubing as shown in the pull-apart drawing below, after which the parts are reassembled in the order given and riveted together. Drill holes in the body of the three-way plug for the switch cord and solder one wire to the prong and the other to the spring contact. The rubber-covered cord is brought into the outlet box through a knockout in the side. The sensitive switch is mounted under the hole in the box cover with an angle iron. A piece of foam rubber is stuffed around the opening to keep out dirt.



The appliance is plugged into the converted three-way plug which in turn is plugged into wall receptacle



Cord from altered plug enters box through knockout in side and is soldered to terminals of sensitive switch



This shows the two halves of the plug ready to be reassembled. One wire is soldered to prong, other to contact



Foam rubber around switch pin keeps dirt out of box. Note tape wound on cord to increase size for connector



Darkroom Apron Folded To Catch Drippings

By turning up the bottom edge of a darkroom apron, you can provide an effective catchall for protecting your trousers and shoes from any developer or hypo that runs down the apron. Simply fold over the apron in the manner indicated and staple or sew the center and ends in place. It's a good idea to rinse the apron in water occasionally to clean out the fold.

Robert C. Florian, Chicago.

Preventing Loss of Adapter Screw

When the tripod adapter screw on an imported miniature camera tends to loosen and eventually become lost, you may pre-

vent this by applying a short piece of cellulose tape over the assembly. Using a sharp knife, cut a hole in the tape just large enough to accommodate the tripod screw and trim off the overhanging corners. The tape will also act somewhat as a soft washer and help prevent the camera from twisting on the head of the tripod.

Robert Hertzberg, Jackson Heights, N. Y.

Simple Lens-Shade Cover

The nonreflecting coating on a camera-lens shade, as well as accessory lenses fitted to the shade, should be protected from dust when not in use. An excellent one-piece cover which caps both ends of the shade and is quickly removable can be made for little or nothing from a strip of spring metal. Rounded to match the ends of the shade, the strip is bent to a U-shape and then lined with felt to provide a snug sliding fit over the lens shade.



Popular Mechanics Bookshop

Ten-Second Quiz

Is your car homeless? Do you need extra room to store storm windows, bikes, trikes, garden tools and other what-shall-I-do-with-it items? Can you saw a board and hammer a nail? Then your best buy is *Build Your Own Garage*, a book that shows even the amateur how to build an attractive and sturdy home for his car. Included are complete instructions and step-by-step photographs, drawings and diagrams that show every phase of garage construction from pouring the footings to nailing down the shingles. The price is only \$3.50 and it's available from Popular Mechanics Press, 208 E. Ontario St., Chicago 11.

The Grass Is Getting Greener . . .

. . . and now's the time to renovate your yard. In *Lawn and Garden* you'll find answers to all your landscaping questions. This book, appropriately subtitled "How to

Grow the Best Lawn and Garden in Your Neighborhood," is a complete guide to lawn care: how to plant trees, flowers and shrubs; how to grow prize vegetables; how to build outdoor fireplaces and lawn furniture; how to fight disease and insect pests. The volume is fully illustrated and has a handy index to help you pin down the answer to any knotty question on lawn maintenance. The price is only \$2.50 from Popular Mechanics Press, 208 E. Ontario St., Chicago 11.

Here's Concrete Information . . .

. . . on concrete, a mighty useful material around the home or farm. *What to Make With Concrete* tells you how to mix it and use it in hundreds of useful projects from inlaid sidewalks to outdoor furniture. There's a special section on coloring concrete and another on building sewage-disposal systems for the farm. Order now from Popular Mechanics Press, 208 E. Ontario St., Chicago 11. The price is \$2.00.

All books available from Popular Mechanics Book Department, 208 E. Ontario St., Chicago 11



SHOP NOTES

Avoid



USE A BACKING BLOCK



END STOP
CLAMP OR USE END STOP



STOP TO SET
DEPTH OF CUT

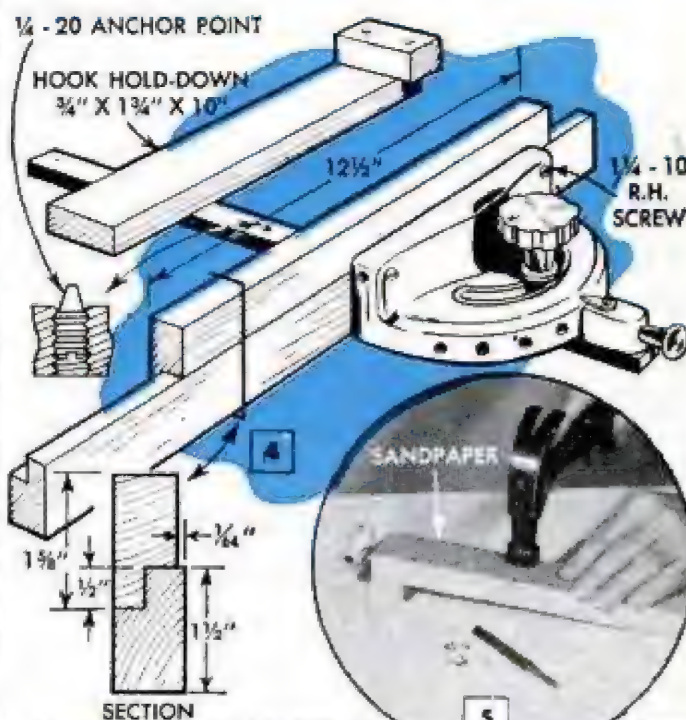
SHAPER JIGS FOR END CUTS

CREEPING and splintering of the work, the two chief problems of the craftsman in shaping end grain, can be prevented by the use of these improvised jigs. To avoid the creeping tendency, a stop must be used, as in Fig. 2, or the work must be securely clamped. Whiskering or splintering is eliminated by using a backing block behind the work, Fig. 1.

A backing block that is on the job all the time is the split, rabbeted style shown in Figs. 3 and 4. The top part is fixed to the miter gauge, while the bottom part can be sawed off and readjusted as needed for each new shape of cut, Fig. 6. If the sliding part is made about 20 in. long it will accommodate about 20 different cuts, after which it should be replaced with a new strip. The screws which hold the top part are loosened slightly to permit the bottom part to slide when resetting for a different shape of cutter.

Clamping the work to prevent creeping can be done in several ways. The hooked, hold-down block shown in Figs. 3 and 4 is quite simple. The bottom of this is covered with sandpaper, Fig. 5, and when pressed against the work will hold it securely. Set-screw anchor points, Fig. 4, positively will stop creeping and can be retracted when not needed. They cannot be used for every job, however, since they mark the work.

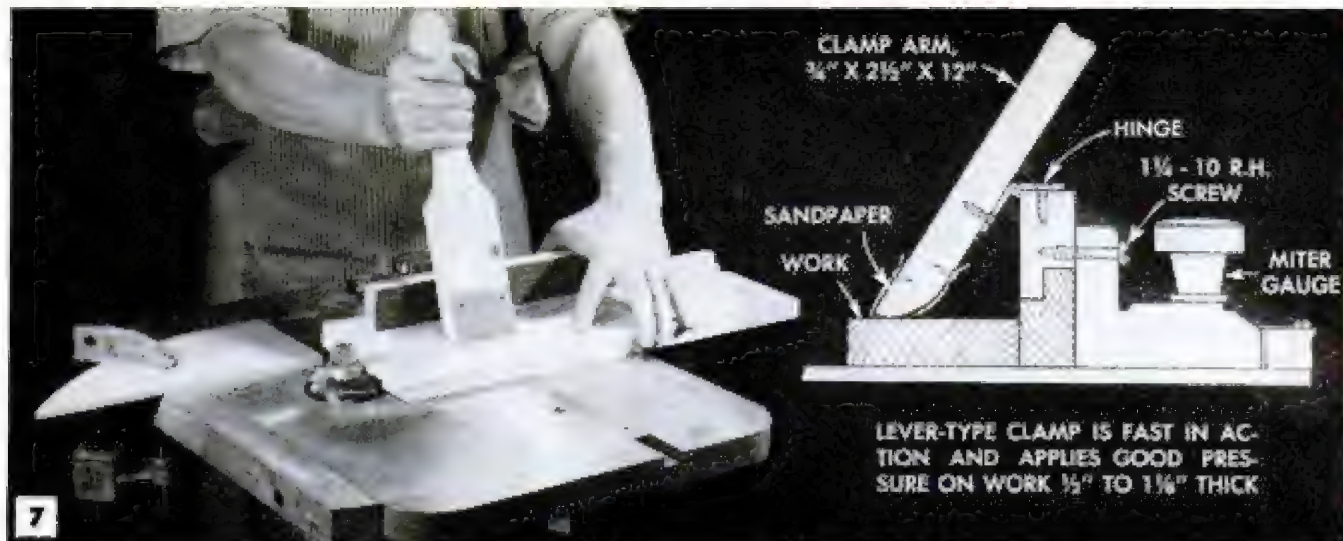
A hinged lever-type clamp is fast and effective, Fig. 7. The pin of the hinge should be swelled slightly by tapping



SECTION



BACKING BLOCK CAN BE TRIMMED WITHOUT REMOVING

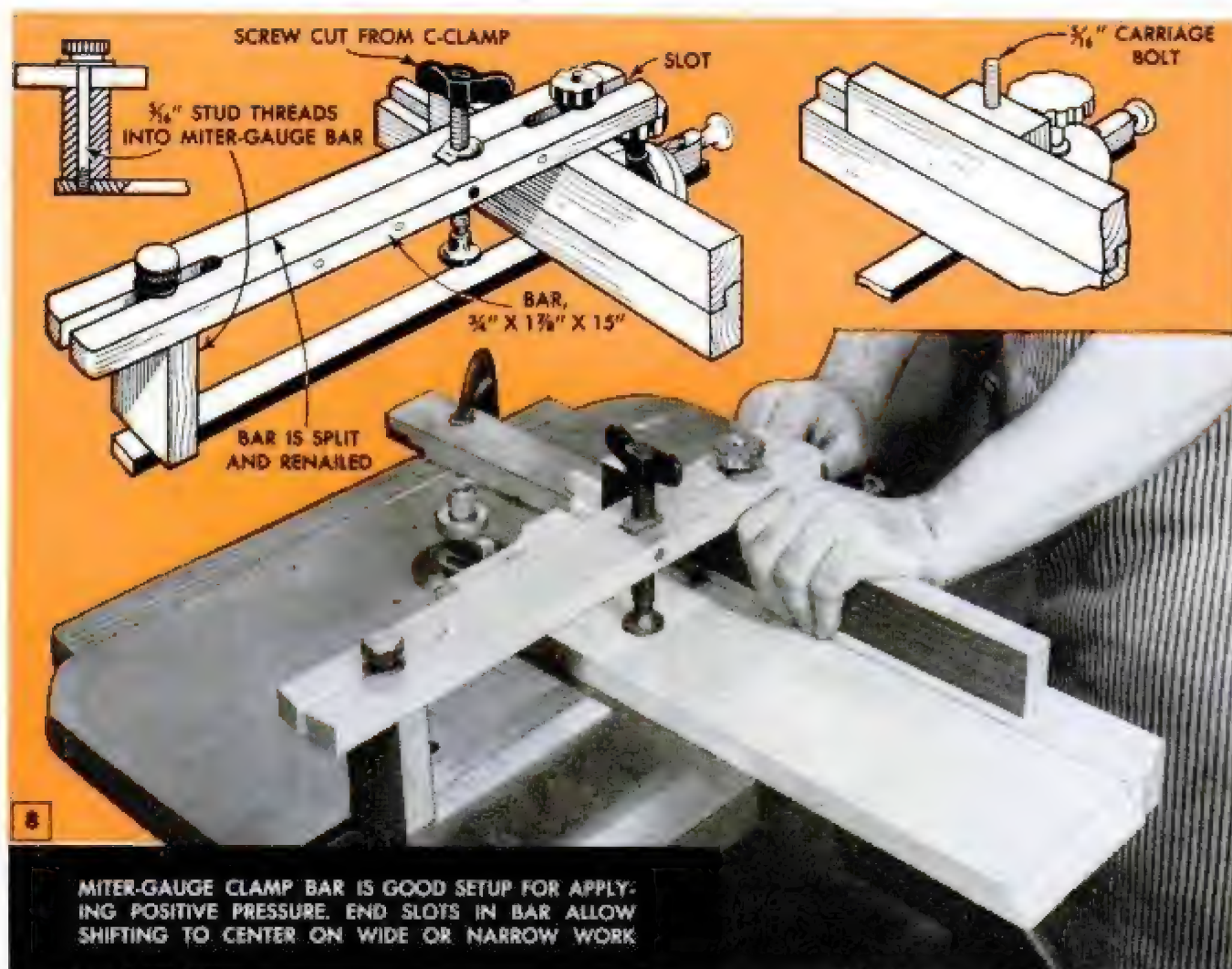


lightly with a hammer to take out any play. This clamp also makes use of a 1/0 or 1/2 sandpaper facing for traction.

For a positive-type clamp, the full-length clamp bar, Fig. 8, is the best style. The simple construction shown uses slots at both ends of the arm to allow adjusting the clamp to center on any width of work. The screw itself can be cut from any inexpensive C-clamp. If the swivel head is larger than the part of the frame through which the screw is threaded (the usual condition), it will be necessary to split the bar to permit fitting. A short section of the

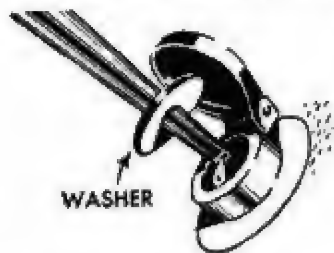
clamp frame should be retained to take a pin or nail driven through the bar. The 5/16-in. carriage bolt which holds the bar to the miter gauge is fitted through a small wooden block, which is then screwed to the miter-gauge facing. Bolt is centered with a miter-gauge pivot pin to allow using the clamp for 45-deg. and other angle cuts.

All fixtures shown work on the circular saw and for end cuts with the molding head. If your miter-gauge screw holes are too low to accommodate the split facing, screw a plain piece of wood to the gauge and fasten the split facing to it. ★ ★ ★



MITER-GAUGE CLAMP BAR IS GOOD SETUP FOR APPLYING POSITIVE PRESSURE. END SLOTS IN BAR ALLOW SHIFTING TO CENTER ON WIDE OR NARROW WORK

Washer Soldered to Oil-Can Spout Holds Open Spring-Capped Oiler



A small washer soldered in place about $\frac{1}{4}$ in. from the tip of an oil-can spout will make it easy to oil bearings having spring-capped oilers that are hard

to reach. The washer permits lifting and holding the oiler cap in instances where it can be reached with only one hand. A copper-rivet washer is preferable for this purpose.—Harvey Muller, Danboro, Pa.

Windproof Flame for Blowtorch Pan

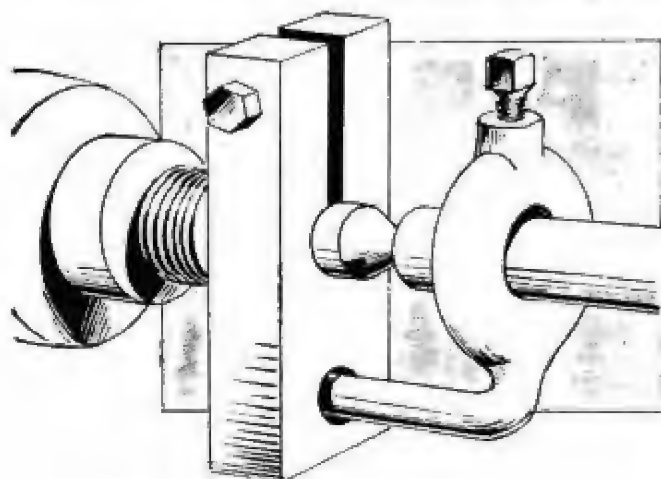
When using a blowtorch outdoors, it is sometimes difficult to preheat the torch because of the wind blowing out the flame in the pan. However, a windproof flame can be provided by bending a pipe cleaner to fit inside the pan. The pipe cleaner will serve as a wick to keep the flame alive.

E. P. Barnhart, Whittier, Calif.

Improvised Lathe-Dog Driver

Modelmakers and toolroom machinists often find it necessary to improvise special lathe-dog drivers when setting up precision jobs on lathes and milling machines. The special driver detailed is designed to prevent chattering and undue backlash when machining light work between centers, using either the conventional dog or the clamp-type toolmaker's dog. It is made from a short piece of $\frac{3}{8}$ -in. flat steel and is center-drilled and taper-reamed to fit the live center at the top end of the taper. It is then slotted through from one end to the tapered hole and is cross-drilled and tapped for a cap screw to provide a clamping action. A slightly oversize hole drilled near the opposite end takes the tail of the dog in the manner shown.

C. W. Woodson, Miami, Fla.



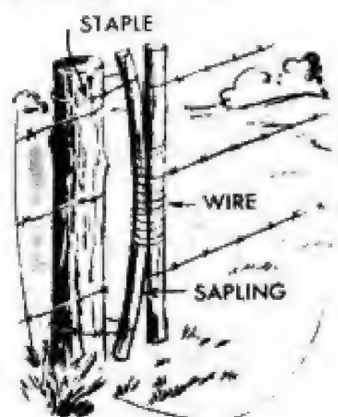
Funnel in Top Step of Ladder Holds Electric Bulbs

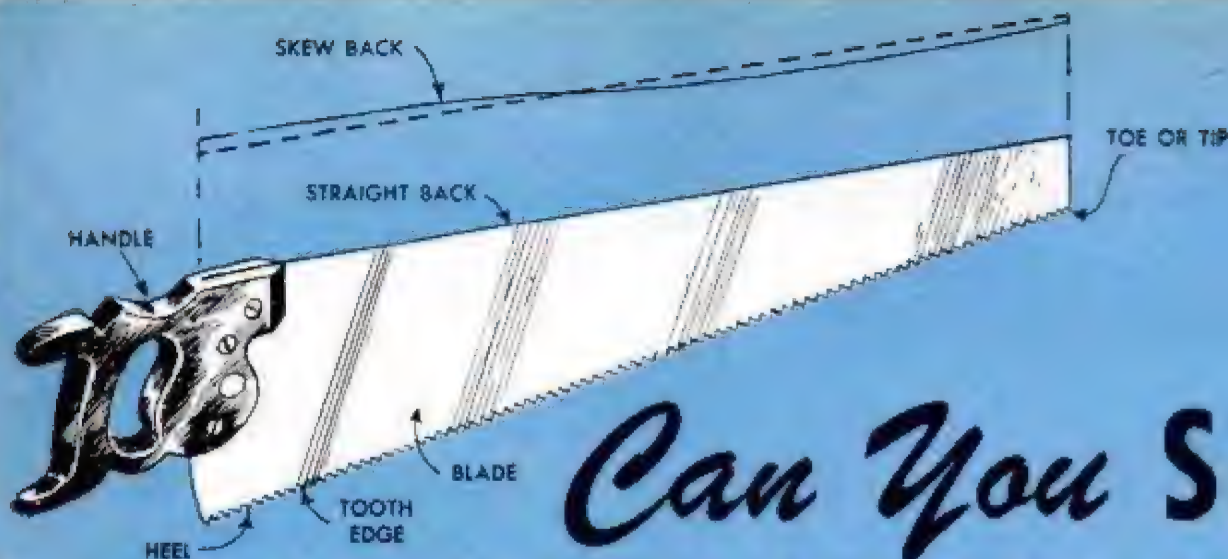
While cleaning or replacing light bulbs in a ceiling fixture, one janitor uses a funnel to hold the bulbs safely. He bored a hole in the top step of the ladder, in which the spout of the funnel was inserted. The same arrangement would be practical as a small toolholder for a carpenter or electrician.

Wire Loops on Field Gatepost Provide Easily Fastened Latch

As field gates made of loose wire stapled to a lightweight post are difficult to close and latch, they are often left open, allowing livestock to pass through. To be sure that the gate is not left open for this reason, one farmer

fitted the loose post with an easily operated latch. The latter is a stout, flexible sapling wired or bolted to the post so that ends of the sapling can be bent outward to engage the latching wires. This not only makes a practically effortless job of latching the gate, but the tension of the bent sapling holds the gate wires taut.





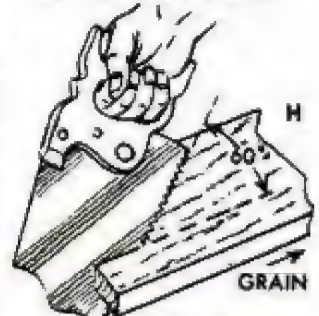
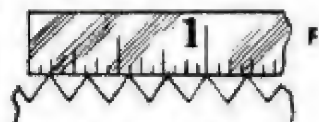
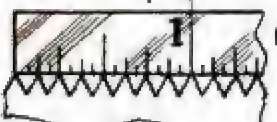
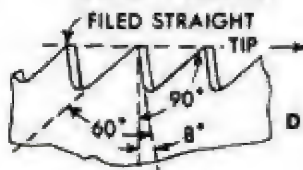
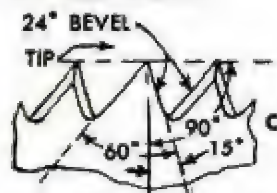
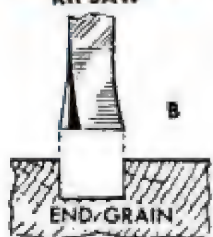
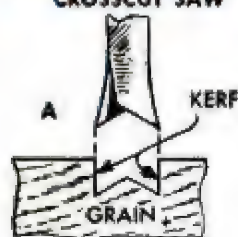
Can You SAW

By E. R. Haan

CROSSCUT SAW

RIPSAW

1

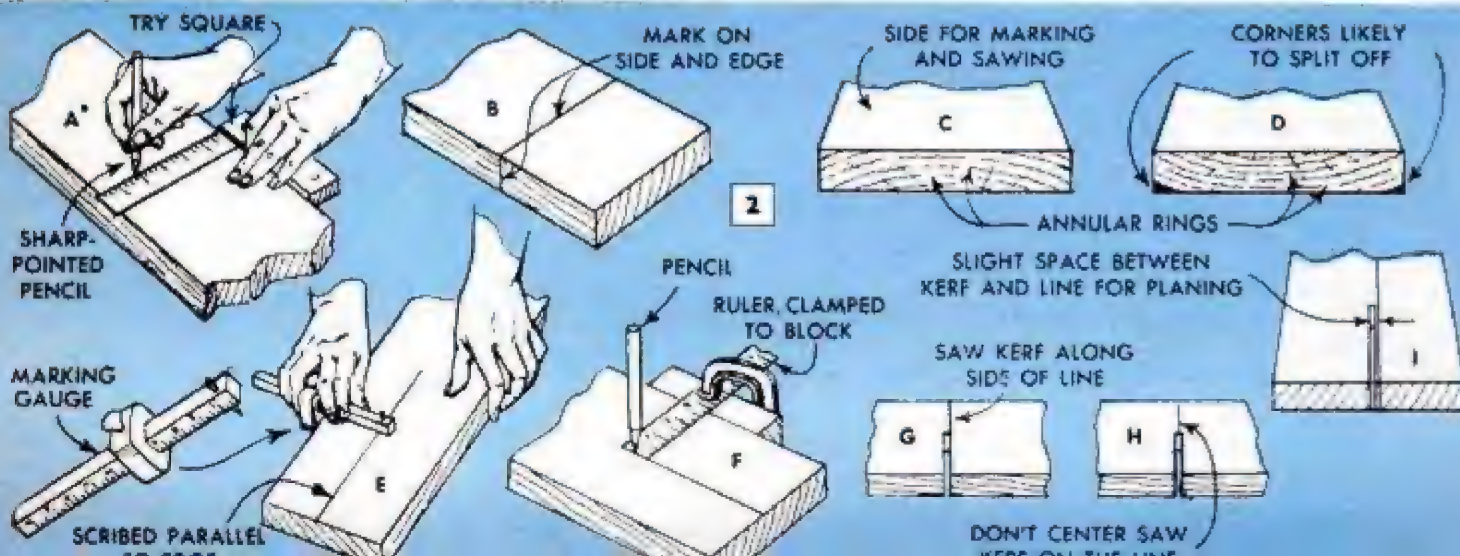


CROSSCUT SAWING ANGLE

ANGLE FOR RIPSAWING

THERE'S NOTHING difficult about sawing straight, but it's more than just pushing a saw back and forth. Accurate sawing depends on: (1) having a good sharp saw that is filed and set correctly; (2) using the right saw for the job; (3) applying the proper technique. Quality saws have taper-ground blades that are thinner at the back than at the toothed edge. This makes sawing easier and minimizes binding of the blade in the cut or kerf. Most homeowners first acquire a 20-in. 10-point crosscut saw, then add a 26-in. 5½-point rip saw and a compass or keyhole saw.

How crosscut and rip saws differ: While they are interchangeable for short cuts, crosscut saws should be used for cutting across the grain in wood and rip saws for sawing with the grain. The teeth of a crosscut saw are shaped like sharp-pointed knives and cut on both the forward and back stroke, making two parallel cuts, Fig. 1-A. The edges of the teeth are beveled at 24 deg. Rip saw teeth have edges filed straight across to cut flat-bottom kerfs like



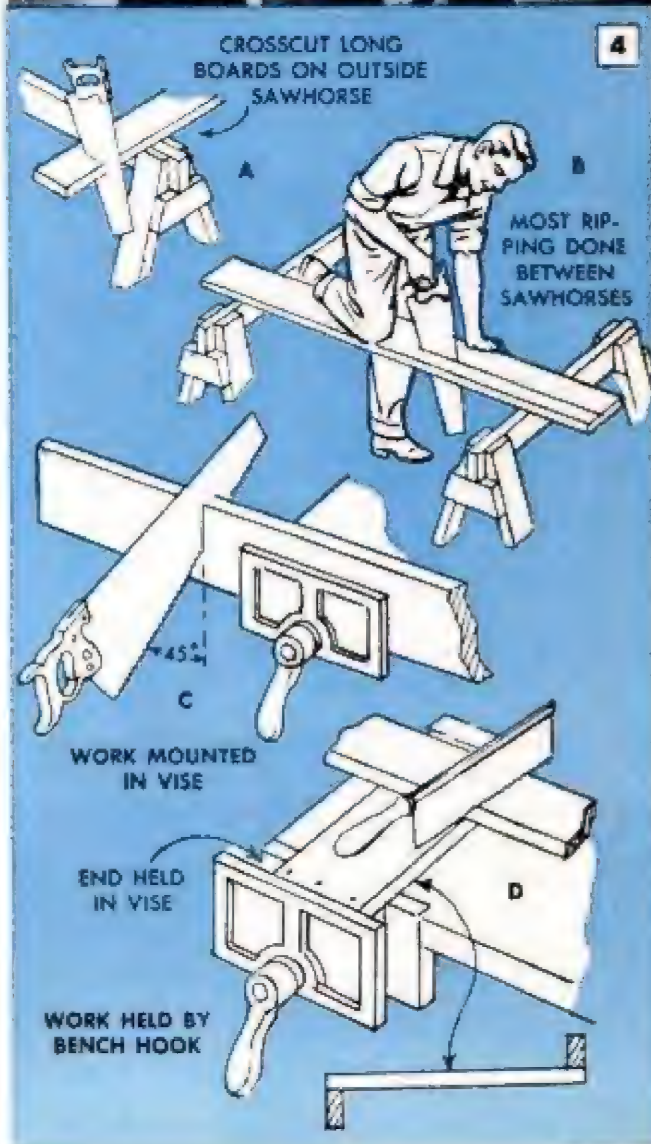
If using a handsaw is just plain hard work and the results are never as good as you expect them to be, here are some things you will want to know. Sawing can be done easily and accurately by following a few pointers of handsaw know-how

STRAIGHT?

tiny chisels, detail B, and cutting is done only on the forward stroke. Teeth of both crosscut and rip saws have an included angle of 60 deg., but the front cutting edges of the teeth of crosscut saws are filed at a 15-deg. angle, as in detail C, whereas the front edges of rip saw teeth have an angle of only 8 deg., detail D. Teeth points must be of equal height. The upper half of each tooth is bent outward or "set" in the direction of its flat side. Thus alternate teeth are set in opposite directions. The set determines the width of the kerf and, being greater than the thickness of the blade, allows it to move through the kerf easily.

The number of tooth points of crosscut saws varies from 7 to 12 points per in., detail E, while points of rip saws number $5\frac{1}{2}$ per in., detail F. Coarse-tooth crosscut saws cut faster but leave a rougher surface than fine-tooth saws. A coarse saw is best for cutting green or wet wood, while a fine one is best for dry, seasoned lumber. Crosscut blades are regularly 20, 22, 24 and 26 in. long, although smaller ones are available. Those shorter than 24 in. are called panel saws. Rip saws usually come in 26-in. lengths. The tooth edge of a crosscut saw should be held at a 45-deg. angle to the work surface, as in G. The best angle for rip sawing is about 60 deg., detail H, but on thin stock a 45-deg. angle is preferable.

Accurate marking: The exact position of a saw cut should be marked off on the work. For a cut at right angles to a straight edge, use a square, Fig. 2-A, and make a thin line with a scratch awl or sharp pencil. It is best to continue the line over the edge of the stock, detail B. Before marking, examine the end grain of the board. If possible, mark and cut from the side, as in detail C, so that the annual rings do not cross lower corners of the stock, detail D, which are apt to break off.

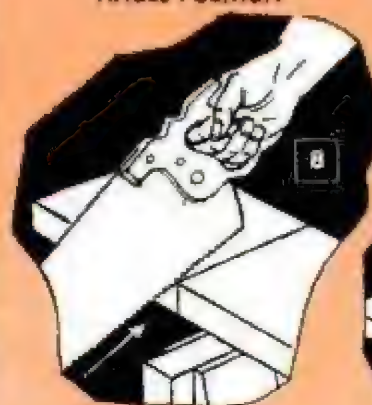




CHECK SAW WITH TRY SQUARE FOR RIGHT-ANGLE POSITION



LET INDEX FINGER POINT TOWARD SAW TIP



START WITH SLOW BACKSTROKE FROM HEEL OF SAW



USE THUMB KNUCKLE TO SUPPORT SAW BLADE WHILE STARTING

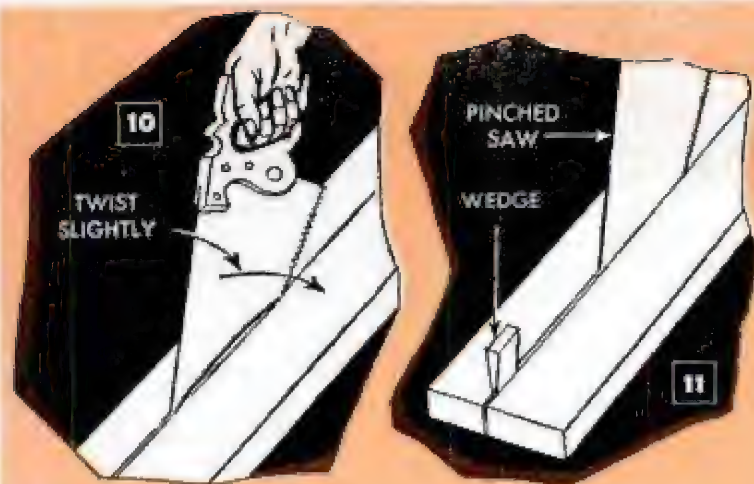
Guide lines for ripping can be made with a marking gauge, detail E, if the cut runs parallel to a straightedge. A ruler and block, detail C, allow marking with a pencil. If the edge of a board to be ripped is not straight, use a straight piece for marking. The saw kerf should always be made in the waste portion of the stock outside of the marked line, detail G, so that the cut piece will be of the exact length. Don't cut midway on the line as in H. If the edge of a ripped board is to be planed smooth to the line, make allowance for it as in detail I.

Holding the work: Work to be sawed must be supported firmly. For crosscutting, you can lay the stock across two sawhorses of equal height, Figs. 3 and 4-A, or on boxes or old chairs. Hold the work with your hand or knee. When crosscutting, saw the work on the outside of one horse, close to it, rather than between horses. Ripsawing long boards is done best between horses or other supports, detail B. Short pieces to be ripped can be placed lengthwise on a horse. Work can be clamped in a vise for crosscutting, detail C, or you can use a bench hook as in D.

Sawing position and end grip: When sawing, bring your eye above the saw blade as in Fig. 5 to observe if the blade is being

held perpendicular to the work surface. If in doubt you can check with a try square, Fig. 6. Grasp the saw handle comfortably and easily with the index finger pointing toward the saw tip, Fig. 7, to help in guiding the blade.

Starting a cut: Whether crosscutting or ripping, start a cut by setting the heel of the blade alongside the mark, Fig. 8, and then pulling the saw back slowly, guiding the blade with the thumb of your left hand about an inch above the teeth as in Fig. 9. The palm of the hand rests on the work. The correct sawing angles, 45 deg. for crosscutting and 60 deg. for ripping, should be maintained throughout cutting. The starting stroke should be almost half the length of the blade, without any pressure. The weight of a saw is enough to start a kerf if the blade is sharp. Never start with a down stroke; you may apply too much pressure, splintering the wood at the edge or causing the saw to "jump." After the first backstroke, push the saw forward without increasing the pressure and continue with short strokes until the kerf is deep enough to retain the blade. Then move your hand about 6 in. from the saw and increase the length of the strokes gradually to full blade length, using very



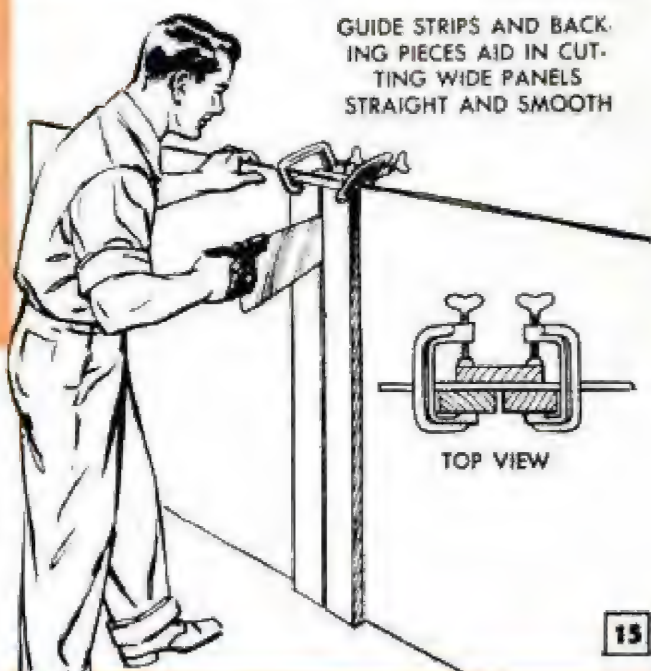
RETURN SAW TO MARKING LINE



DON'T USE SAW TO PRY OFF WOOD BEFORE FINISHING THE CUT



HOLDING WASTE END TO PREVENT SPLINTERING AT FINISH OF CUT



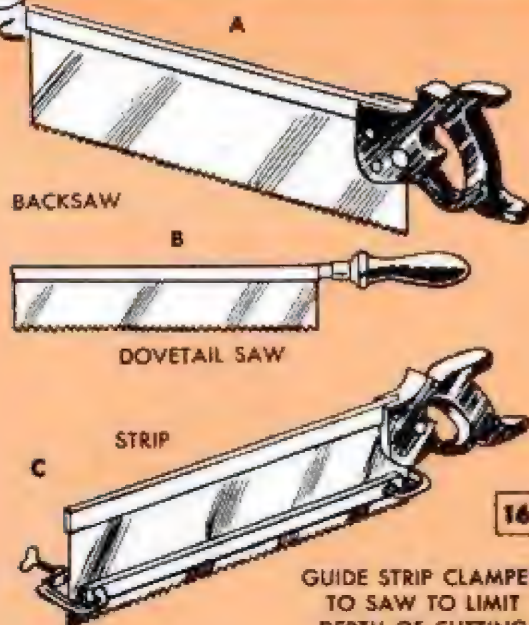
GUIDE STRIPS AND BACKING PIECES AID IN CUTTING WIDE PANELS STRAIGHT AND SMOOTH

TOP VIEW

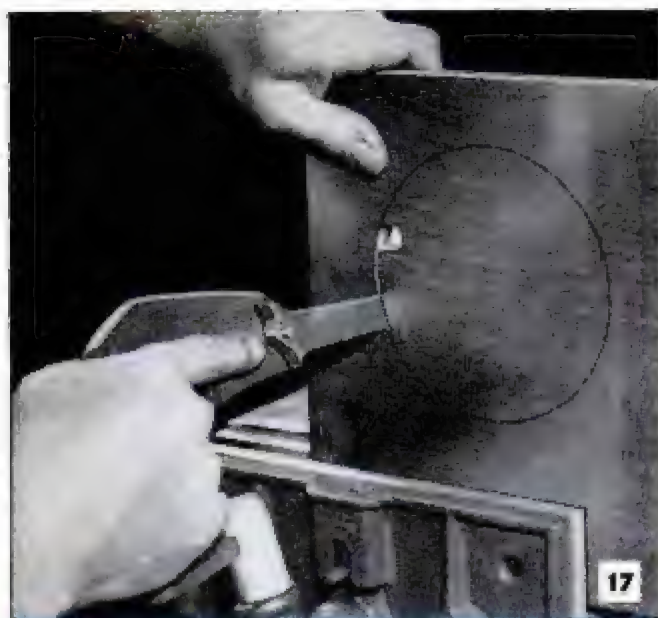
light pressure on the forward strokes only.

Sawing technique: Always start forward strokes slowly and increase the speed gradually. This minimizes the possibility of kinking if the blade should bind in the kerf. Kinks ruin blades for accurate cutting. When a saw drifts away from the marked line, apply a slight twist on the handle to bring it back, as in Fig. 10; don't twist the blade forcibly, as this may kink it. A saw that has a constant tendency to run off toward one side is not filed or set correctly, or the blade may be bent out of true. If the saw tends to cut at a slight angle, the blade is not being held perpendicular to the work surface. Bend the blade back to position gradually.

Vibration of the saw blade on upstrokes usually indicates that it is being held at too steep an angle with the work. When the stock pinches the blade, sawing becomes difficult and kinking may result. When crosscutting, you may be able to open the kerf slightly by exerting pressure on the waste portion with your hand. Or you can use a wedge above the saw position, Fig. 11, which also is used to spread the kerf when rip sawing. Sometimes binding occurs when crosscutting between two supports and can be corrected by moving



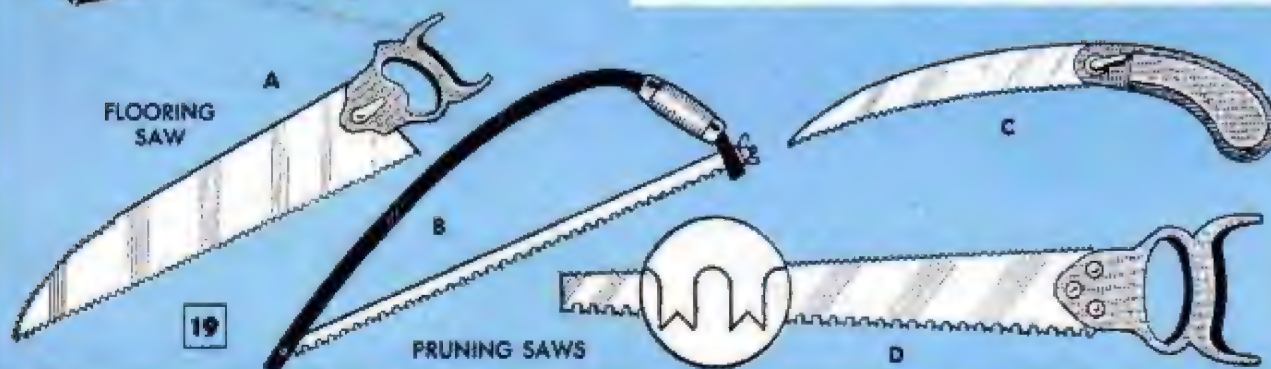
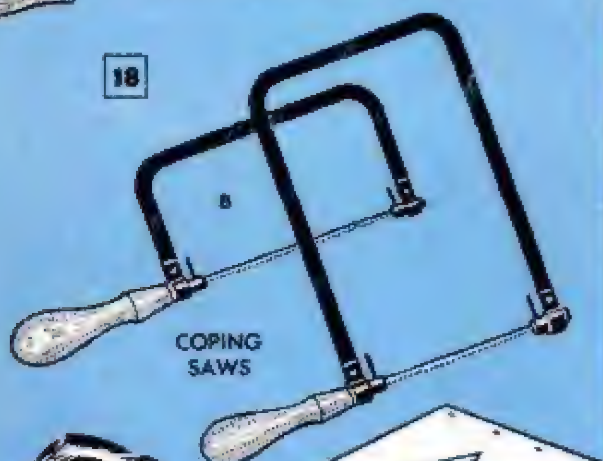
GUIDE STRIP CLAMPED TO SAW TO LIMIT DEPTH OF CUTTING



17



18



one of them closer to the sawing position.

Saw through knots slowly and carefully to avoid loosening them. When nearing the end of a cut, reduce the sawing speed and use short, delicate strokes while holding the free end of the stock with your left hand, Fig. 13. This prevents the end from breaking off and splintering a portion of the wood. Don't use a saw to pry off short waste ends, Fig. 12, or to break apart two pieces being ripped. In sawing old lumber, examine the stock and extract all nails in the path of sawing. If a broken-off nail is contacted, use a "nail" saw to cut through it—one having the same or greater width of set than the saw being used.

Sawing large panels: When sawing large panels of plywood, wallboard, insulation or plasterboard, you can make a straight cut with little fraying of the fibers on the back side by using two wooden guides and a backing piece, Fig. 15. Set the panel vertically. The guide pieces are spaced the width of the saw teeth and are clamped to the backing piece. You saw through the latter. For plasterboard, use an old saw or a plasterer's saw.

Accurate angle sawing: For cutting angles accurately, it's best to use a miter box, Fig. 14. To make a miter box of average size, use 2-in. stock for the bottom and 1-in. stock for the sides. The front should extend below the bottom to hook against the bench top. It also can be clamped in a vise. If used often, a miter box should be clamped or screwed to the bench. Mark the angles to be cut in the sides with the aid of a combination square. A regular cross-cut saw can be used in a miter box for most rough work, but for fine, accurate work use a backsaw or dovetail saw. The slots in the miter box should be cut with the saw which is to be used in it. The work is first marked, then held firmly in the miter box against the back and bottom, positioned so the cut will be made along the line. Raise the handle end of the saw slightly and draw the saw back to start the kerf. Then saw horizontally until the cut is finished.

Saws for accurate work: For extreme accuracy in cutting moldings, picture fram-

ing and other light stock, and for forming close-fitting joints, recesses, etc., use a backsaw or a dovetail saw. Backsaws, Fig. 16-A, come in lengths from 10 to 16 in., and have 12 or 13 points per inch. Dovetail saws, detail B, are small versions of backsaws; come in 6 to 12 in. lengths with 15 to 17 points per inch. A miter saw is similar to a backsaw but is 20 to 26 in. long, with 11 points per inch. On all three types, the blade is stiffened by a steel rib along the back. For accurate work the guide line on the stock should be cut with a knife; a pencil line is too thick. When sawing to a predetermined depth, clamp a guide strip on the blade, detail C.

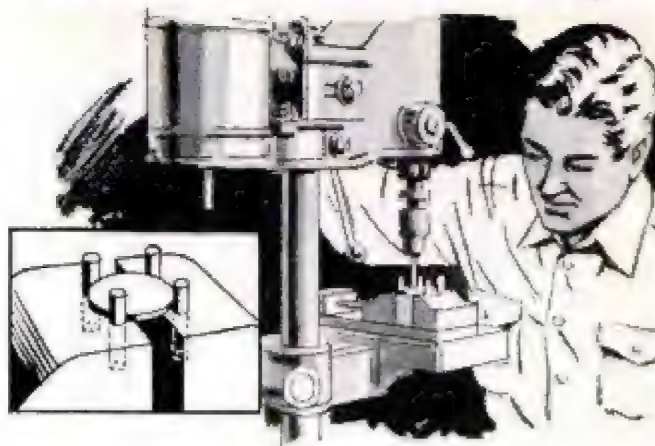
Curved and internal cuts: For rough cutting of curves and internal cutouts, use a compass or keyhole saw, Figs. 17 and 18-A. A compass saw has a 10 to 16-in. blade, 8 to 10 points per inch and the teeth have a wide set. A keyhole saw is similar but smaller. The narrow blades of these saws permit turning in a small radius. Short strokes are best and the blades must not be bent. Twist the handle slightly to control cutting direction. For internal cuts, first bore a hole to admit the tip of the saw. In rough cutting, saw a little farther from the line to allow the wood to be dressed smoothly to the line with a file or spokeshave. The work usually is held in a vise.

For finer and more intricate work involving very small radii, use a coping saw, Fig. 18-B. The throat clearance of the coping-saw frame may vary from 6 to 12 in. The thin narrow blades can be inserted so that cutting is done on either the pushing or pulling stroke, the latter being less likely to kink or break the blade. A horizontal support having a V-shaped cutout, detail C, permits the work to be moved in any direction while sawing.

Special-purpose saws: Handsaws for cutting sheet metal have fine teeth milled straight across and tempered for filing action. A flooring saw, Fig. 19-A, has teeth on both edges. Such a saw eliminates boring holes to admit the blade when cutting into a flat surface that cannot be sawed from an exposed edge. Pruning saws, details B, C and D, may have straight or curved blades with teeth on one or both edges.

Saw care: Keep your saw sharp; it will be easier to use and will cut more accurately. Some home craftsmen prefer to do their own saw sharpening but the work is very exacting and the average homeowner will find it best to have sharpening done by an expert. Sap and other gummy substances that adhere to saw blades can be removed with a rag dipped in benzine. Prevent rust by keeping the blade coated with oil when not in use. ★ ★ ★

Vise Holds Thin Stock for Drilling



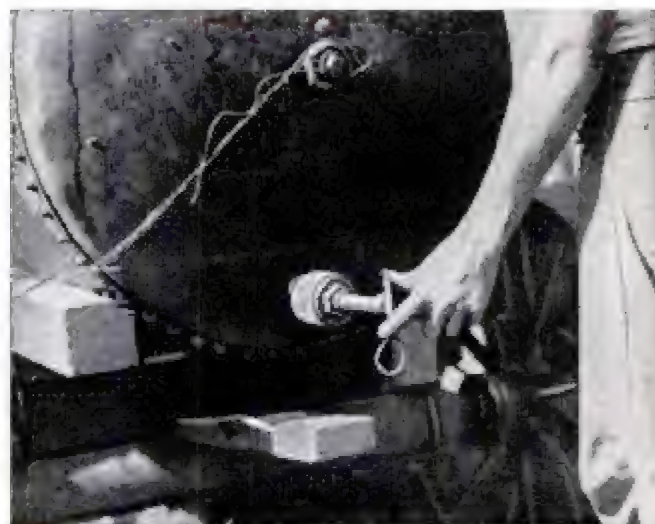
Clamping small-diameter disks and other thin, flat parts in a drill-press vise is no longer a problem if each vise jaw has been fitted with a pair of dowel pins which project above the jaws to engage the work. Use $\frac{1}{4}$ x 1-in. dowels, drilling the vise jaws for a sliding fit so that the pins may be removed easily. Allow the pins to extend about $\frac{1}{2}$ in. above the jaws. If desired, a line of three or four holes can be drilled in the top of each jaw so the pins can be moved to hold work of various sizes and irregular shapes without the jaws being opened so far that they do not provide adequate support for the work.

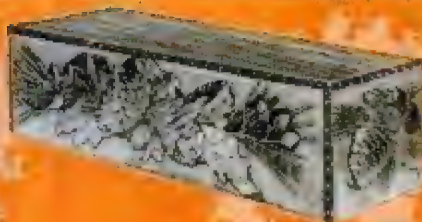
Victor H. Tauferner, Hawthorne, Calif.

Boiler on Wheels Carries Water To Turkey Flock in Field

Mounted on the running gear of a wagon, this boiler is used by one farmer to supply water to his turkeys. In the field it is connected to a system of rubber hoses to feed water into a number of troughs from which the flock of several thousand birds water. The outlet pipe of the tank is fitted with reducers and a short pipe or nipple which fits into the hose line. To close the outlet pipe a screw cap with a bar welded across it for leverage is threaded onto the nipple.

James Roth, Wayland, Iowa.





It's Fun to

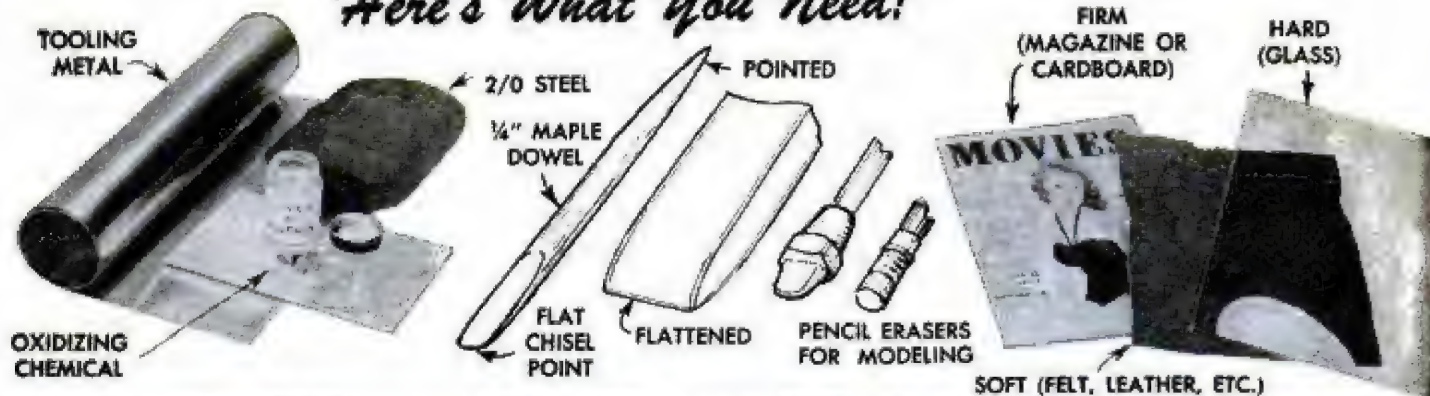
TOOL METAL

By Sam Brown



IF YOU CAN trace around a design with a pencil, you can tool metal—it's that easy! What's more, if you are the least bit artistic by nature, you'll enjoy this means of producing attractive bas-relief plaques and trays as well as decorative coverings for wastebaskets, jewel and cigarette boxes similar to those illustrated above and on the opposite page. Currently the most

Here's What You Need!

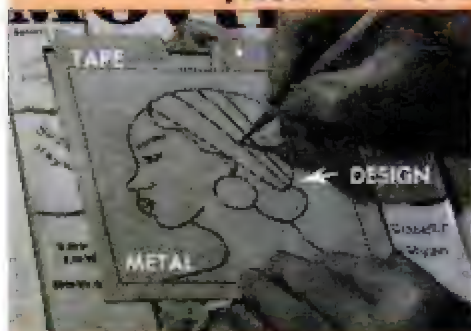


MATERIALS

TOOLS

WORK SURFACES

This Is How It's Done!



1 DRAW THE DESIGN, USING 3H PENCIL OR POINTED DOWEL

2 RETRACE DESIGN WITH POINTED TOOL TO DEEPEN OUTLINE

3 TURN WORK OVER AND TRACE INSIDE OUTLINE

back of book



popular of the metal crafts, metal tooling has gained much of its widespread acceptance through offering an end product that can be produced at comparatively low cost without need for special skills.

Simple tools used: The designs may be drawn freehand or traced from a drawing or photograph. Of the few simple tools needed, the basic one is a short length of $\frac{1}{4}$ -in. maple dowel flattened at one end and pointed at the other. Also necessary is a narrow block of wood tapered at one end, see page 218. The only other "tools" required for the more simple designs are two pencils, one of which is fitted with a slip-on eraser.

Three kinds of surfaces for supporting the work will be necessary. Felt or rubber can be used for a soft surface, while a magazine or piece of $\frac{1}{8}$ -in. mounting board will provide a firm surface. The hard surface can be glass, metal or marble.

Materials needed: The tooling metal can be either copper, aluminum, bronze or brass. Copper is by far the most suitable, inasmuch as the soft, annealed condition in which it is sold has just the right amount of "give" for easy tooling. Other advantages favoring the use of copper are its golden-orange color and the ease with which it may be oxidized or antiqued. From a mechanical standpoint, aluminum is easiest to tool. Though not antiqued as readily as copper,



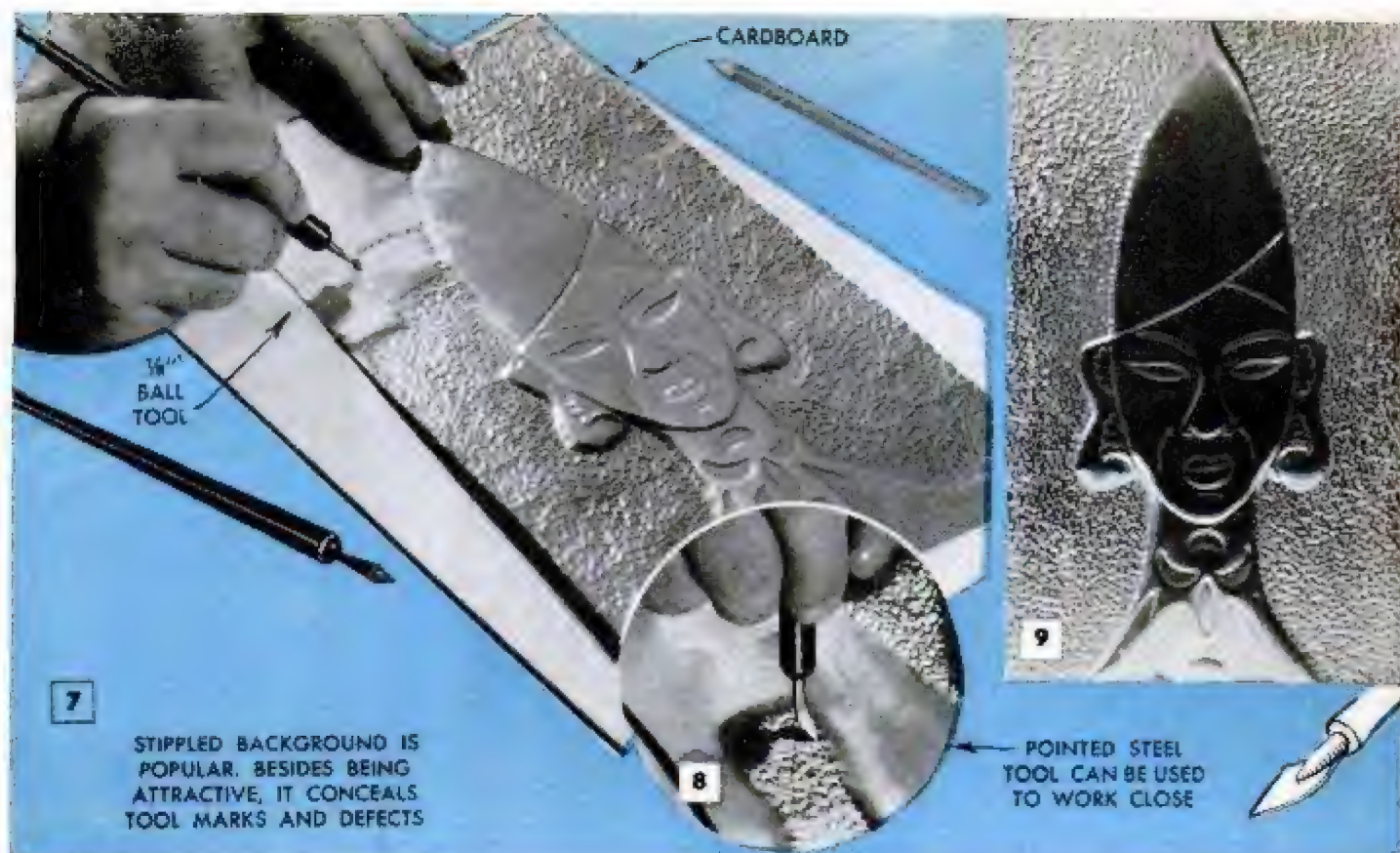
4 WITH WORK ON GLASS, PRESS OUT FROM BACK WITH ERASER



5 TURN WORK FACE UP AND FLATTEN THE BACKGROUND



6 POLISH WITH STEEL WOOL AND APPLY CLEAR LACQUER



STIPPLED BACKGROUND IS POPULAR. BESIDES BEING ATTRACTIVE, IT CONCEALS TOOL MARKS AND DEFECTS



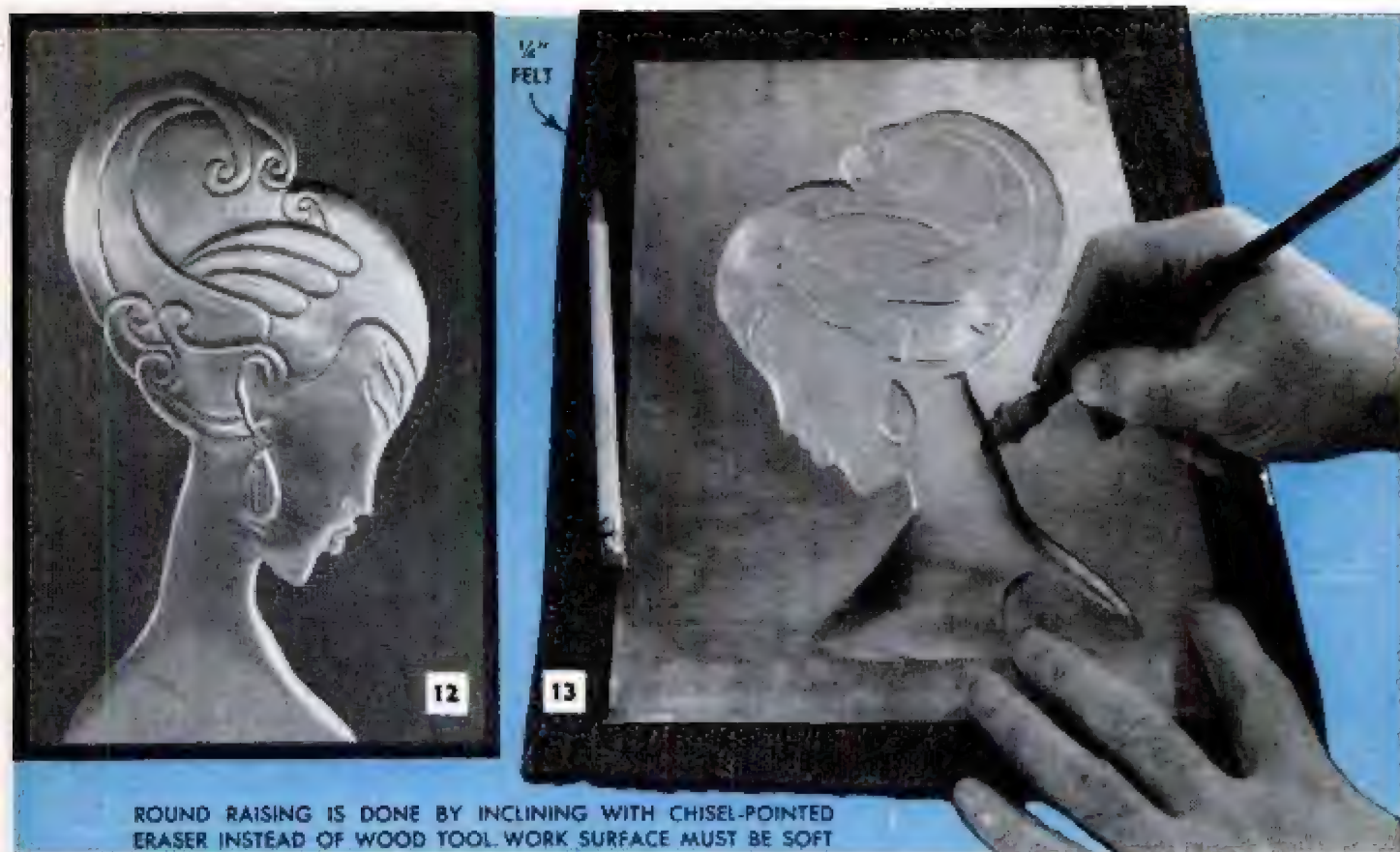
aluminum can be painted with transparent lacquers to produce a variety of beautiful effects. All metals are available in roll form 12 and 18 in. wide, and are polished and ready for tooling. For additional data, see Fig. 11.

How tooling is done: Besides hundreds of design patterns that are available, your own can be made from photographs and illustrations. Start by taping the design to the metal and tracing the outline with the dowel or a hard-lead pencil, Fig. 1. The pencil is most suitable because it leaves a light mark on the pattern which indicates how much has been traced. The work is placed on the firm surface for this operation, keeping the convex side of the slightly curved metal up. This is preferable for the face or front of the work. Pressure when tracing should be slightly heavier than when writing. Ease up at the beginning and end of each stroke to avoid making undesirable dots in the metal. After

11

Quick Data on Metals for Tooling

Metal	Best Weight	Tooling Pressure	Chemical Coloring	Remarks
COPPER	35 OR 36 GA.	TOOLS EASILY WITH MEDIUM PRESSURE	BLACK AND BROWN SHADES ARE OBTAINED WITH LIVER OF SULPHUR IN WATER SOLUTION	BEST ALL-AROUND METAL FOR TOOLING. WORKS EASILY WITH WOOD TOOLS. POLISHES NICELY WITH 2/0 OR 3/0 STEEL WOOL. PRICE ABOUT 50c SQ. FT. (1952).
ALUMINUM	34 OR 35 GA.	VERY SOFT; EASY TO TOOL	NO SIMPLE METHOD OF COLORING; IS ATTRACTIVE PAINTED WITH TRANSPARENT LACQUERS	THE EASIEST METAL TO TOOL—IS ACTUALLY TOO SOFT FOR FINE DETAIL, HENCE THE HEAVIER WEIGHT RECOMMENDATION. EXCELLENT FOR DEEP RAISING. PRICE ABOUT 25c SQ. FT.
BRONZE	35 OR 36 GA.	ALMOST AS SOFT AS ALUMINUM; EASY TO TOOL	NO SIMPLE METHOD OF COLORING; CAN BE BLACKENED BY HEATING	TOOLS EASILY; A BIT SOFT FOR FINE DETAIL BUT EXCELLENT FOR CONTOUR WORK. BRIGHT GOLD COLOR POLISHES NICELY. IDEAL FOR HEADS. PRICE ABOUT SAME AS COPPER.
BRASS	36 GA.	FAIRLY HARD; REQUIRES FIRM PRESSURE	VARIOUS SHADES OF BLACK ARE OBTAINED WITH COPPER-SULPHATE SOLUTION	MUST BE DEAD SOFT; NOT A BEGINNER'S METAL SINCE IT DOES NOT YIELD READILY TO TOOLING PRESSURE. EXCELLENT FOR FINE DETAIL. GOOD FOR ORIENTAL MOTIF. SAME PRICE AS COPPER.



ROUND RAISING IS DONE BY INCLINING WITH CHISEL-POINTED ERASER INSTEAD OF WOOD TOOL. WORK SURFACE MUST BE SOFT

tracing the design, remove the pattern and go over the work once again to deepen the lines, Fig. 2.

Next, turn the work over and trace a line just inside the raised outline, Fig. 3. This operation also is done on the firm surface. After you have gained more experience, this operation may be done on leather or thin rubber to permit deeper impressions, the one disadvantage being a slight increase in distortion around the edges of the design. The "in" line should be made with the tool held at an angle over the outline, with the latter serving as a guide. In determining which side of the outline should be inlined, always keep in mind that you inline on the side that is to be raised.

Now place the work face down on the hard surface and flatten all large areas with the pencil eraser, Fig. 4, rubbing the work out with light, even strokes. Then turn the work face up and flatten the background areas with the large flattening tool, Fig. 5. Use the flat end of the dowel for areas adjacent to the lines. Make all strokes in the same direction to flatten the metal without undue buckling. The strokes should be made with the "grain" which, in tooling metal, consists of fine, parallel lines on the surface. When the entire design has been pressed out, polish it with 2/0 or 3/0 steel wool and brush or spray with clear lacquer, Fig. 6.

Backgrounds: One of the most common troubles when tooling are the marks usually left on plain backgrounds. A simple

remedy for this is the textured background, Fig. 9. Of the many which may be produced easily, the plain stipple is one of the most attractive. On average work this is done with a 1/8-in. ball tool, or an escutcheon or clinch nail driven in the end of a dowel can be used. First dot in a circular area about 1 in. in diameter, Fig. 7, and then use a pounding stroke, Fig. 10, to stipple inside this area, repeating the operation until the entire background is completed. For working close to the design, any kind of pointed tool may be used, Fig. 8, but it must be used with care to keep the metal inside the line free of distortion.

Parallel lines provide an excellent background and also help level buckled metal. Stippled lines can be used to depict clouds. Crisscross lines, Figs. 23 and 24, provide an attractive background and are made with the point of the dowel guided along a straightedge. Painted backgrounds, usually painted black, are the simplest of all, Fig. 12.

Round raising: After doing work in the basic flat-raising technique, you undoubtedly will want to try round raising, Fig. 12. The only difference between the two is that instead of inlining with the dowel point, the design is raised with pencil erasers when round raising, Fig. 13. The work is placed on a soft surface and a round eraser used to raise all large areas inside the design. Use light, fast strokes but avoid excessive pressure which might leave ridges in the metal. This technique is ideal for heads and other designs having large open



F-GRIT
SILICON
CARBIDE

2/0 STEEL WOOL

14

OXIDIZED WORK IS HIGH LIGHTED WITH 2/0 STEEL WOOL OR F-GRIT SILICON-CARBIDE ABRASIVE WITH WATER



15

Oxidized



16

High Lighted

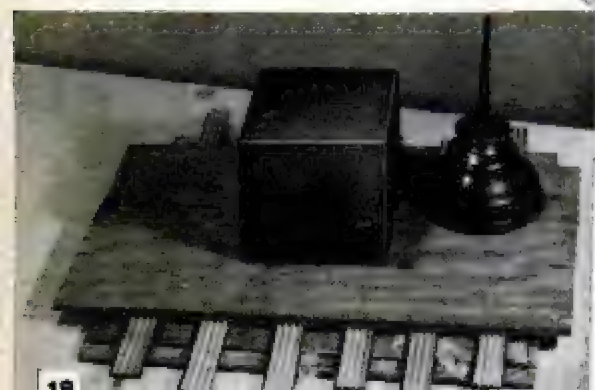
areas of varying depths. The two techniques very often are combined, since most designs will have one or more large areas for which round raising is more suitable, together with details requiring the clear definition possible only with flat raising.

Oxidizing: If the work is to be oxidized which, along with antiquing, is done to make various lines stand out in greater relief, copper should be used because it is the easiest and most economical of the metals to treat. All you need is an ounce of liver of sulphur to supply you for several jobs. After dissolving a couple of pea-size lumps in a glass of water, use a wad of steel wool to swab the work with the solution. The metal will begin to darken almost immediately and eventually turn black, Fig. 15. When the metal is the shade desired, rinse under running water to stop the action, then allow the work to dry naturally—do not wipe. When the work is dry, rub it with steel wool to high light, Figs. 14 and 16. If this seems too mild, use F or FF-grit silicon-carbide grains with water and

Right, spachtling compound, to which varnish has been added for flexibility, is troweled into depressions on back of work to prevent crushing. Plywood frame having design cut out of center supports work during operation. A damp cloth is used afterward to clean metal around the design



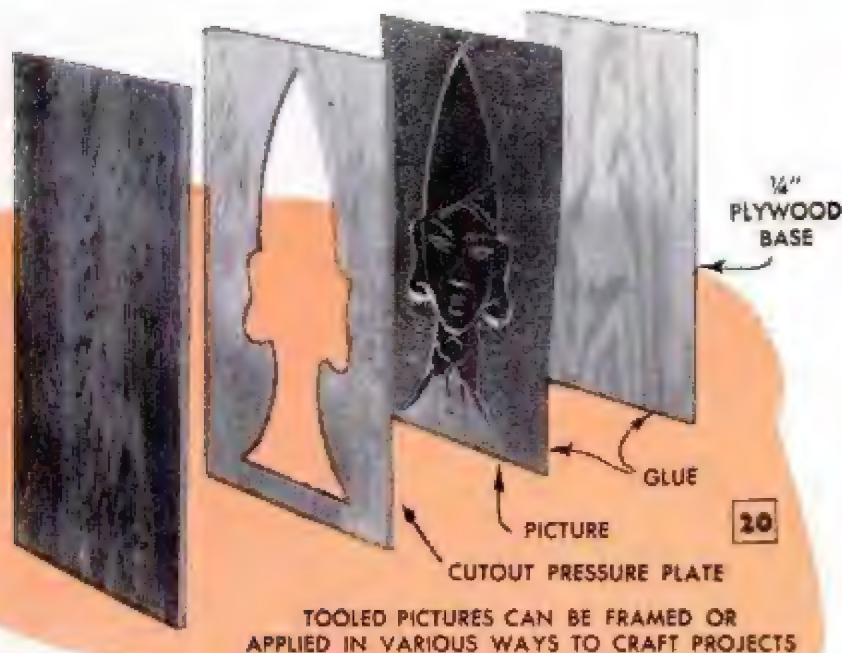
PLYWOOD
SUPPORT
FRAME



18



19



20

rub with steel wool. For best results, oxidize the copper to a deep brown rather than black, controlling the intensity by the strength of the solution. It's a good idea to experiment a bit before doing any actual work.

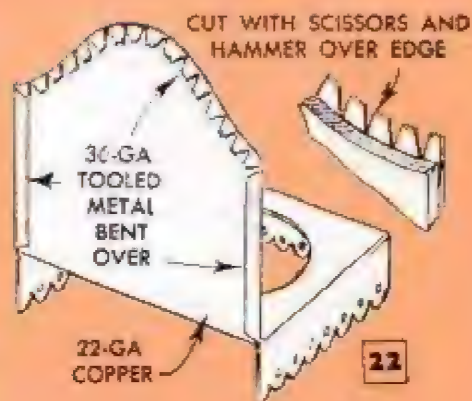
Backing: All large, deeply formed work should be backed to prevent possible crushing. The backing can either be wax, which is flowed on hot, or plaster which is troweled into the depressions, Fig. 17. Plaster or spachtling compound, to which varnish, 1 teaspoon per cup, has been added for flexibility, is preferable for this purpose. Mix the plaster with your fingers until there are no lumps left which might make a mark when drawn across the work. The work should be supported closely on wooden blocks or a fairly accurate cutout of the design. After leveling it with a trowel or wooden straightedge, use a wet cloth to clean the metal around the design. Hold the work flat for drying by using oiled sticks under a weight, Fig. 18.

Mounting: Properly done, the work can be laid flat for framing as easily as a design on paper. For simple outlines such as heads, a plywood cutout may be used, Fig. 20, for pressing solidly against the background when gluing the work to a plywood backing. This type of backing may be trimmed by sawing or the edges can be bent over, Fig. 19. If used for a tray, Fig. 24, the work should be placed under glass to withstand wear better. When used for a decorative covering, the light metal is bent easily over heavier metal objects, Figs. 21 and 22, or nailed to wooden objects as in Fig. 23.

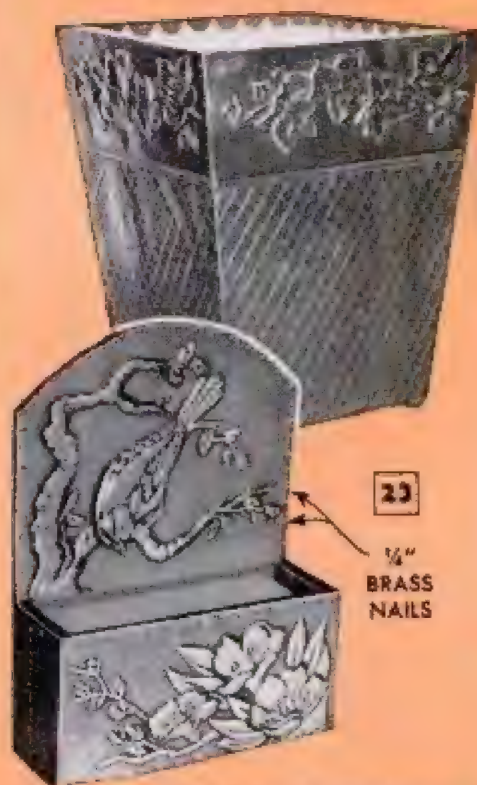
★ ★ ★



21



22



23

1/4" BRASS NAILS

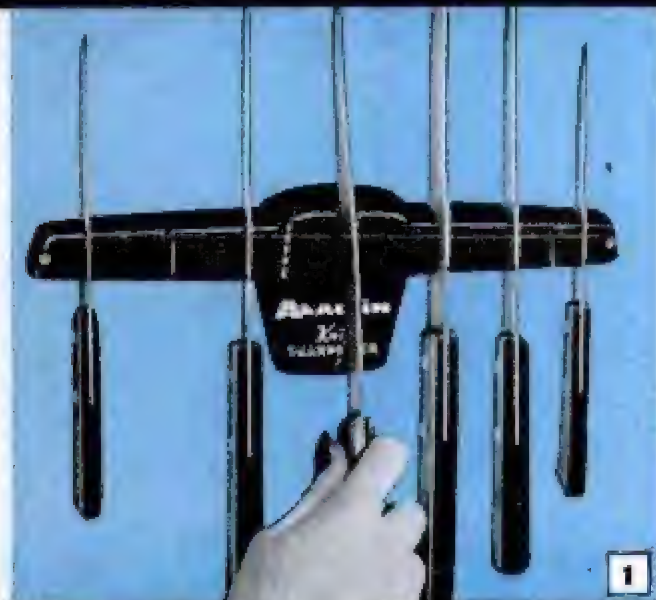
Design courtesy Hazel Pearson



ROUNDHEADED UPHOLSTERING NAILS

24

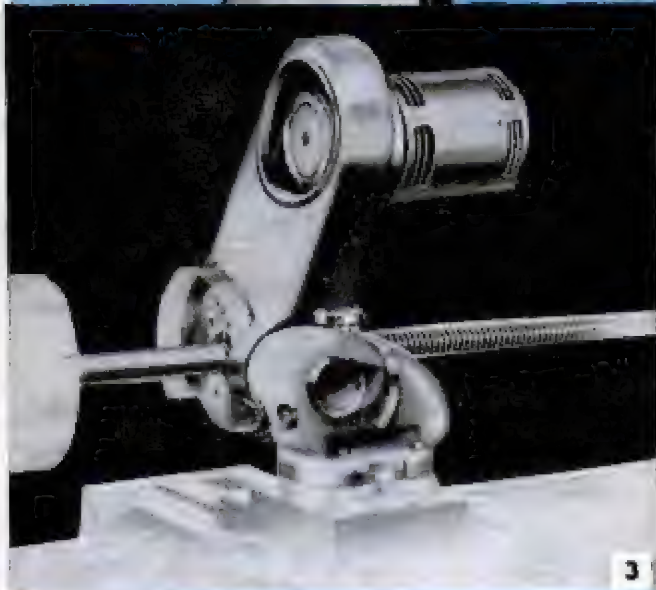
SHOPPING FOR TOOLS



1



2



3

1. **KNIFE RACK** features a built-in sharpener and a vacuum "pad" on the back which holds securely on wood or tile walls. Knives are held in special blade-gripping slots cut in the body of the holder. Slots hold blades of various sizes securely without dulling edges

2. **PORTABLE VAPOR-TYPE DEGREASER** is designed to use the latest type of nonflammable chlorinated solvent. Unit is entirely self-contained and comes equipped with automatic mercury control switch and manual starting switch for operation on 110 or 220-volt current. Solvent container is insulated to prevent heat loss. Oil, grease, pitch and other foreign matter are removed from auto and machine parts, lens-grinding tools and instruments in a matter of seconds, leaving no discoloration or film. Metal parts, or containers filled with small parts, up to 21 in. in diameter can be lowered into the unit at one time



4



5

3. LATHE ATTACHMENT cuts square, buttressed, vee and rounded threads, also worms, in less than half time required by conventional methods. Cutting is done by a tool similar to a round die, which moves around the work eccentrically, cutting thread in a continuous operation. Eliminates pitch inaccuracies

4. CHECK PROTECTOR perforates checks in one stroke from left to right, eliminating any possibility of tampering or raising. Does not affect the legibility of the writing. To use, grasp the check in the left hand as pictured, open the protector and place at the left-hand margin. Then move to the right as shown

5. ALIGNING SCOPE brings new accuracy to machine tooling and assembly of intricate parts. Optical elements in the scope establish basic lines of sight between the ends of objects to be aligned. An optical micrometer displaces the line of sight either vertically or horizontally to indicate misalignment

6. HOMEOWNER'S TOOL KIT includes essential hand tools for nearly every type of home-repair job that does not require the use of special power equipment. All tools are stored in an attractive metal toolbox with a four-compartment tray which provides for storage of smaller items where they are always at hand

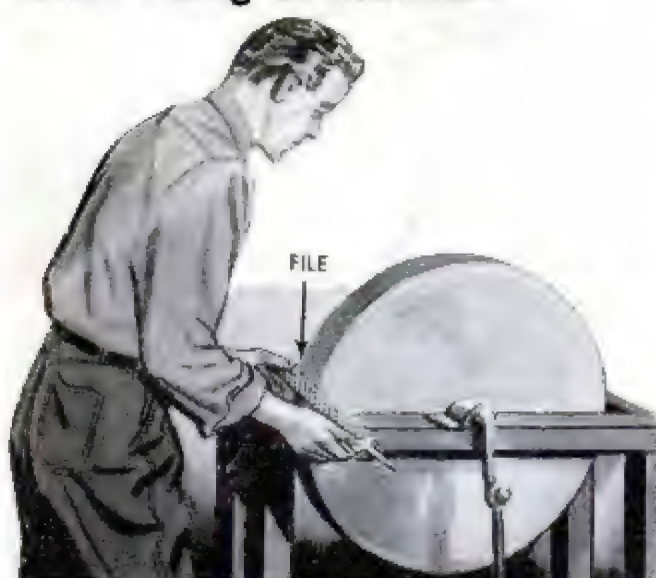
7. SINK-BORING TOOL is available for installation of electric garbage-disposal units in existing sinks. Tool consists of a carbide-tipped scriber or circle cutter and a boring head that enlarges the drain opening in cast-iron sinks to the required size. Both scriber and boring head are driven by 1/2-in. drill

8. HEAVY-DUTY IGNITION COIL for cars and trucks produces hot spark on no more than two-volt input. Gives longer life to contact points in distributor and requires no special condenser. Primary and secondary windings are placed side by side on the core, giving precise operating balance over a wide range of speeds

9. DOWELING JIG has a rotating indexing head, or guide, which can be positioned for center, off-center, or angle drilling of dowel holes in stock from 3/8 to 4 in. thick. Frame of the jig adjusts to any thickness of wood within these limits and locks securely in place. Guide locks in any of four positions



Chisel Used to Chip High Spots When Truing Grindstone

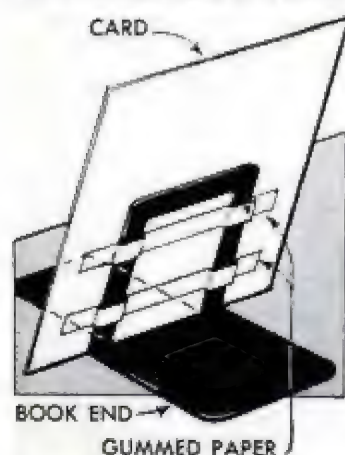


Water used on a grindstone eventually causes any soft spots to wear more rapidly than the rest of the stone, producing an uneven grinding surface that is no longer useful for most practical purposes. One way of truing the stone is by holding a file against it as shown to mark the high places, after which a cold chisel is used to chip them away. Following this, the file is used again to smooth any irregularities in the stone.—Ervin L. Strayhorn, Beebe, Okla.

Oil Drum Used as Stump Burner

An oil drum with both ends removed can be used to burn dead tree stumps. Place the drum over the stump, fill it with dry grass, wood shavings and similar rubbish and ignite. Feed more fuel into the drum from time to time. In 48 hours the stump should be sufficiently burned to allow easy removal with an ax and spade. If the drum rests too flat on the ground to allow sufficient draft for the fire, holes may be cut in the side near the bottom.

Book Ends Replace Easel Backs Of Merchandise-Display Cards

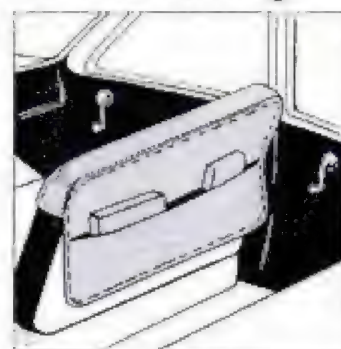


When the easel back of a counter display card becomes bent or broken so it will no longer support the card, remove the easel and attach the card to a metal book end with strips of gummed paper. If a display card supports merchandise, the book

end should be substituted for the easel before the card is put out on the counter, as such cards tend to warp and fall from the counter after a short time.

Auto-Seat Pocket Holds Catalogues

To keep catalogues and order books handy for easy selection, one salesman uses a pocket like the one shown in the illustration. Made of canvas, it slips over the back of the front seat and can be removed easily when the car is to be used for personal service. The pocket may be partitioned if desired.



Thin Cutoff Tool for Metal Lathe

For delicate cutoff work or for cutting narrow grooves with a metal-turning lathe, a discarded hacksaw blade serves as an excellent cutoff tool. As no side clearances are needed, the end of the blade is ground to the same bevel as the original cutoff-tool bit. The blade is clamped in the tool-holder together with the original tool bit, but is allowed to extend beyond the cutoff bit slightly more than the depth of the intended cut.

C. H. Wheeler, Eau Claire, Wis.

Depth Gauge on Posthole Digger

To save time when digging postholes, one farmer marked a scale on the side of his digger to enable him to tell at a glance whether or not the holes are of a uniform depth and extend below the frost line. The scale reads from 16-24 in. with a line marked every 2 in. as shown.

Gary C. Gillum, Lawrence, Kans.

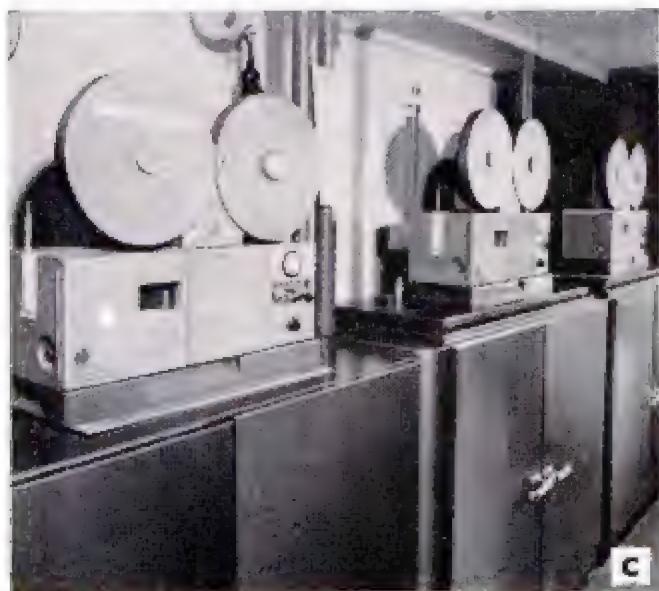


TV RECORDING SYSTEMS

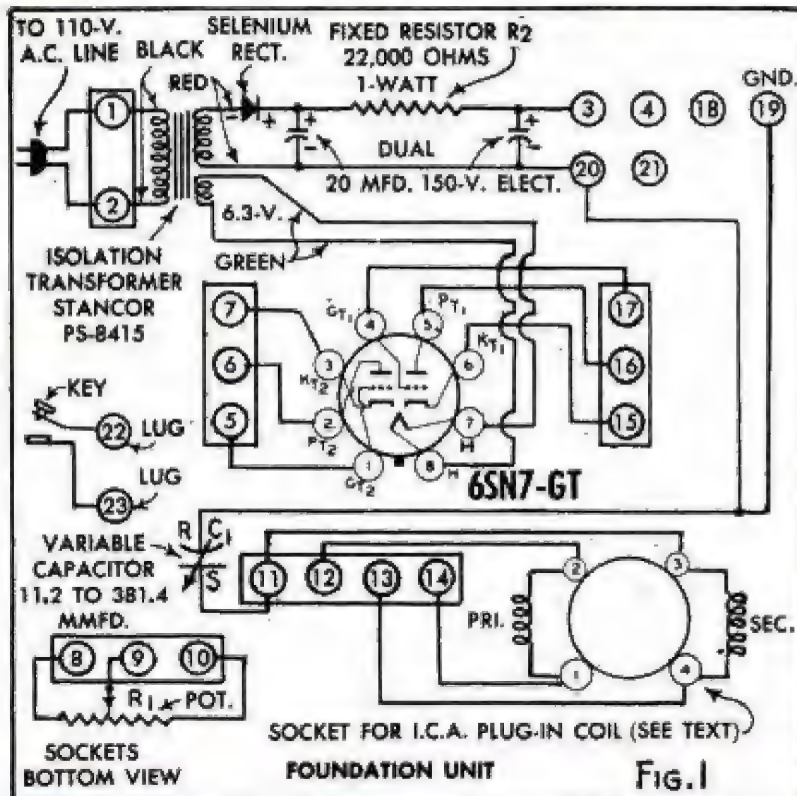
THREE KINESCOPE-recording systems are used in the NBC New York TV studios, all employing 16-mm. film. The kinescope recording (or teletranscription) is a recording made on motion-picture film from the screen of a television monitor. After the recording has been made and developed, this filmed program can then be sent out to other TV stations.

The ordinary kinescope recording can be on one of two systems, the single or double system. In the latter, the negative picture is recorded on one film and the sound track on another. The synchronized positive prints then are made on one film. In the single system, sound and picture are recorded directly on the same positive film. It is possible to reverse the polarity in projecting film on television and, if time is pressing, a negative can be used with electronic reversal.

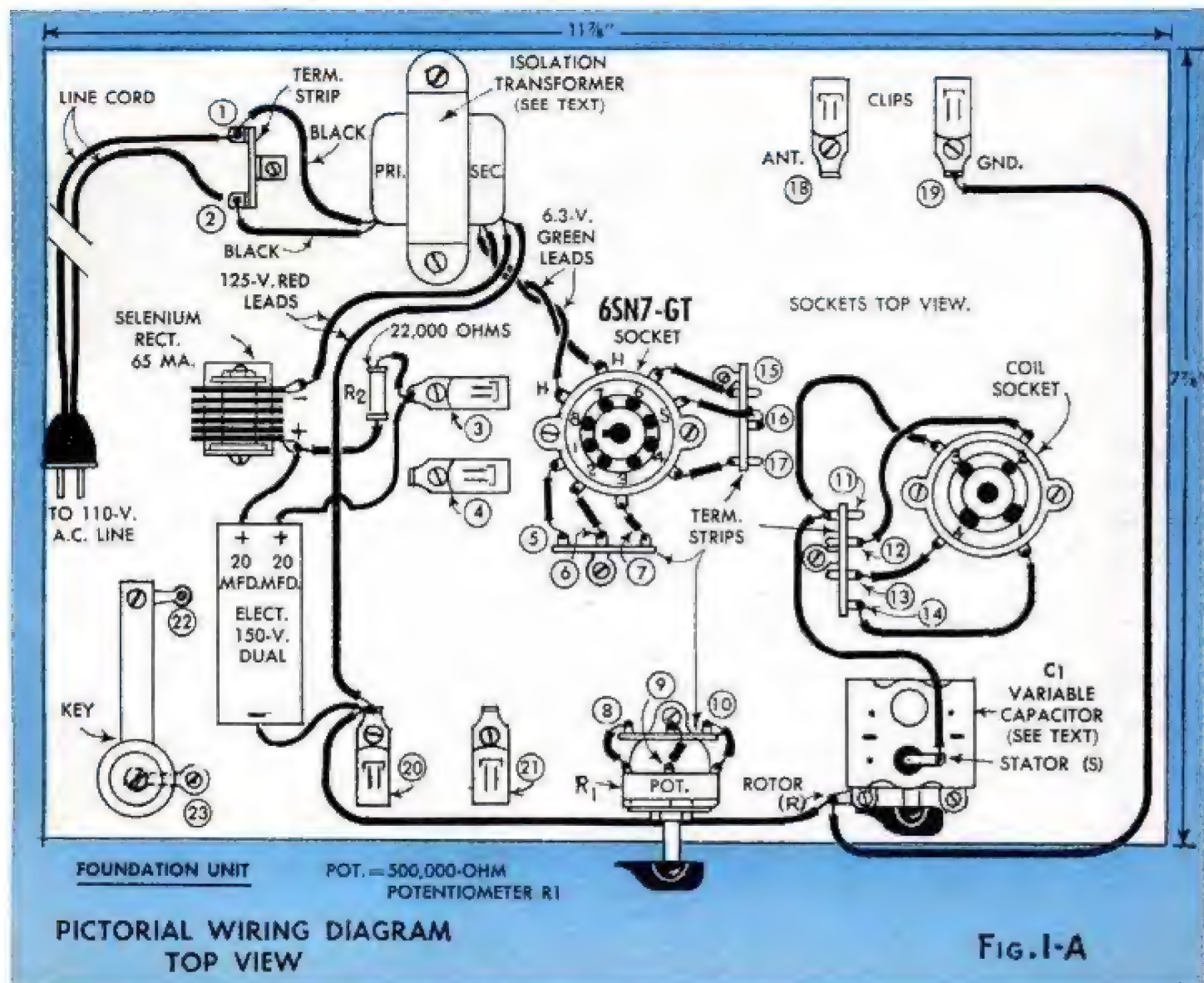
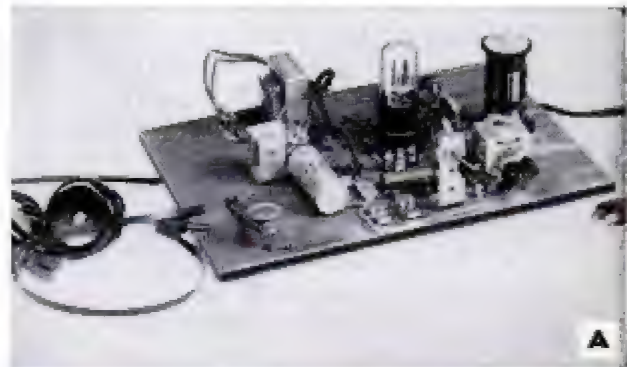
A third, or quick method, referred to around NBC as the "hot kine," is a single system in which the film is fed directly from the recording camera into a complete processing machine attached to the camera. On a half-hour show, for example, it is possible to put the show back on the air, via hot kine, in about six minutes. Photo A shows engineer Herb De Groot in the kinescope-recording laboratory; the general control panel appears in photo B. The magnetic-tape, sound-recording equipment used in the double system is illustrated in photo C. Three combination kinescope-recording machines are shown in photo D.



SIX-IN-ONE RADIO LAB. PROJECT



THE BEGINNER cannot obtain a clear understanding of radio without actually building the basic circuits and evaluating their merits. Even the most prominent electronics engineers, in many cases, got their start from building and experimenting with 1-tube circuits. Today the field of electronics has progressed to a point where television, guided



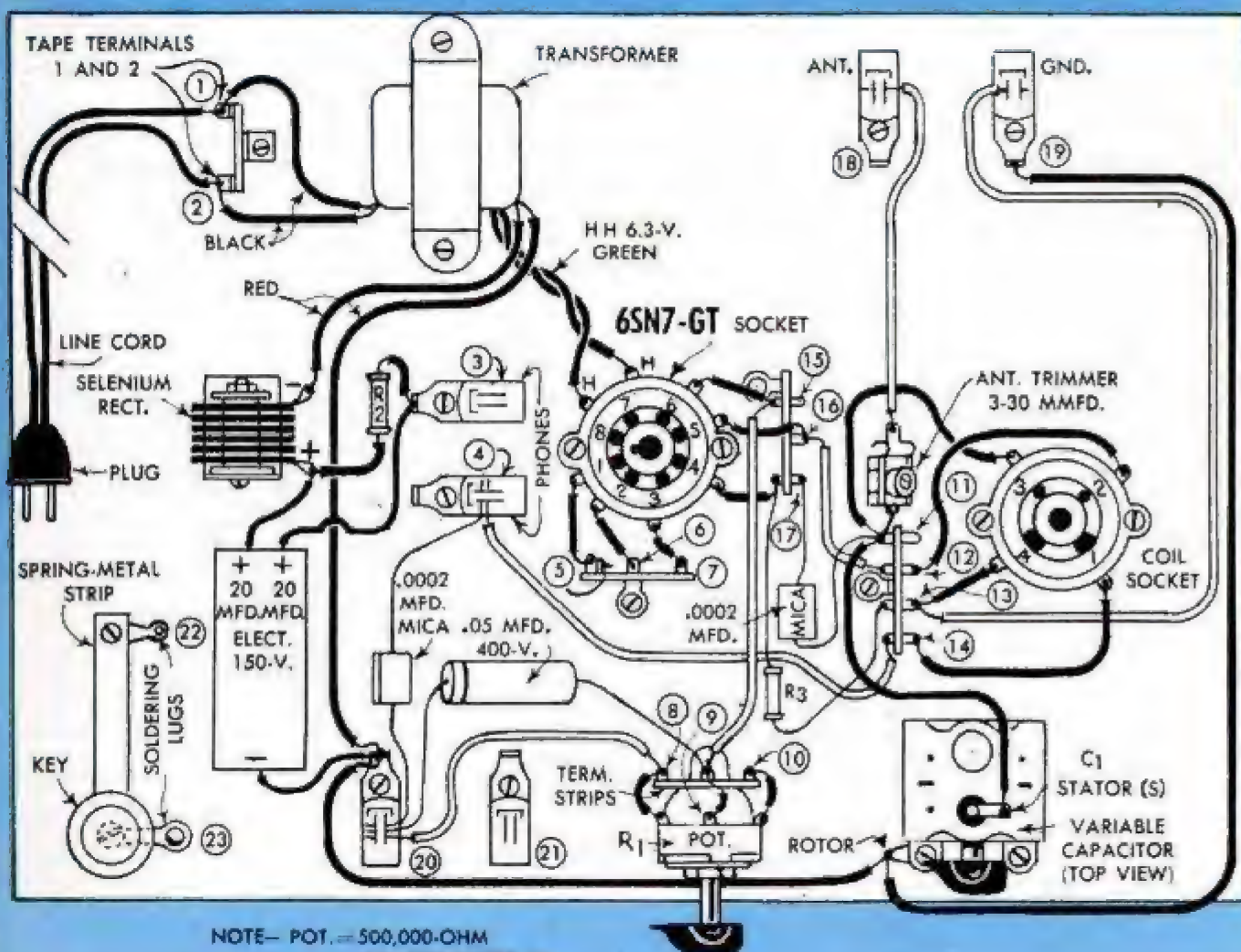
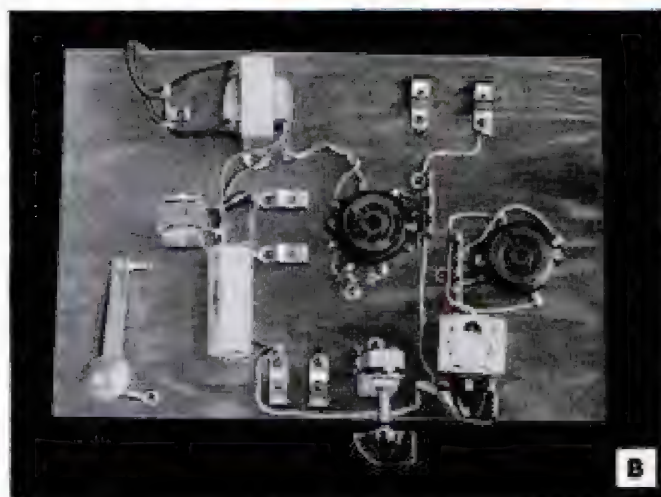
FOR BEGINNERS

By Stephen Gordon

missiles, automatic calculators, etc., have become a part of our everyday language, yet even the most complicated electronic equipment still requires the use of some basic circuits which, though improved, have been in use since the beginning of radio.

This simple radio-laboratory project was designed to permit the construction of several circuits using a small number of inexpensive components to keep the builder's cost to an absolute minimum. The six circuits described here include a diode detector; a diode detector-audio amplifier; a grid-leak detector; a plate detector; a regenerative detector and a code-practice oscillator; all complete operating units.

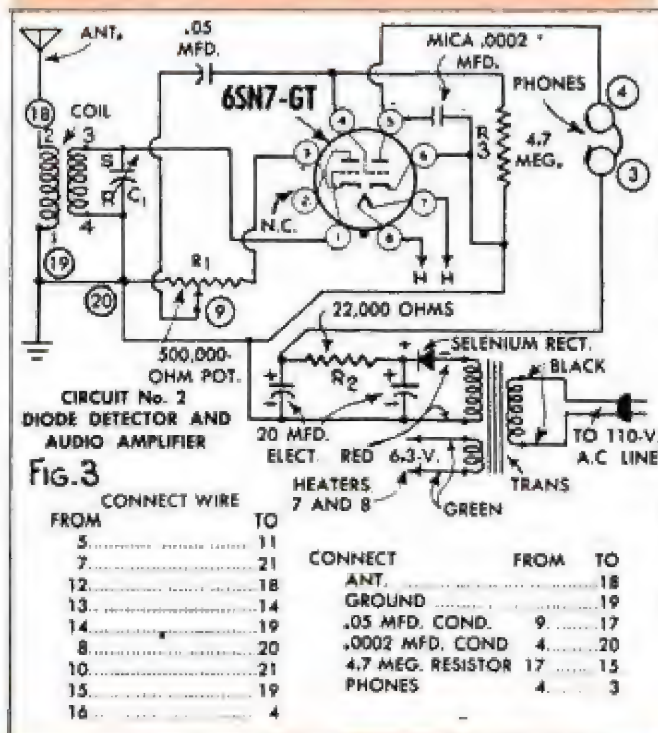
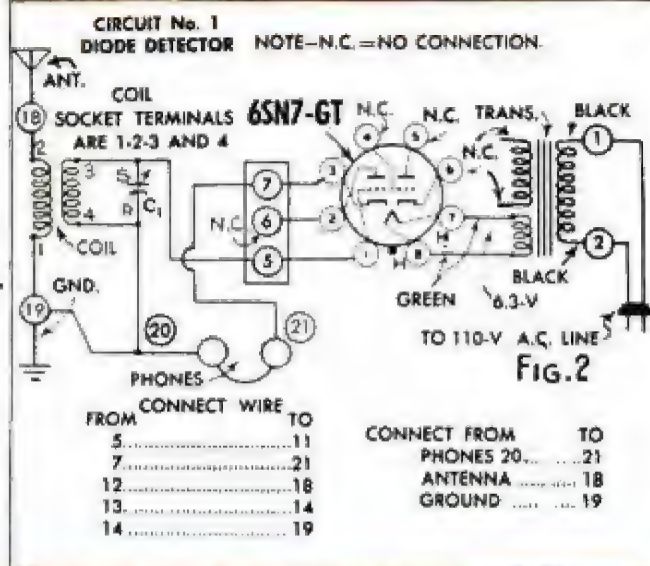
Space does not permit a discussion of the theory behind the various circuits as this is to be found in elementary radio textbooks. Teachers will find these circuits an excellent supplement to radio and electronics textbooks for classroom purposes.



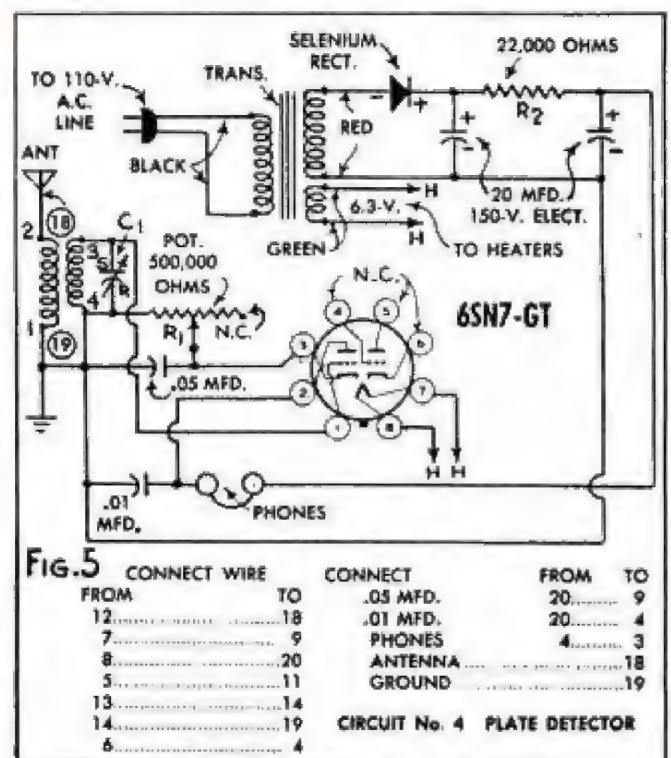
NOTE— POT. = 500,000-OHM
POTENTIOMETER R1.
SOCKETS TOP VIEW.
→ ALL FOUNDATION
LEADS ARE HEAVY.

COMPLETE CIRCUIT No. 5
REGENERATIVE DETECTOR
SEE FIG. 6

R2=22,000 OHMS, 1-WATT
R3=4.7 MEGOHMS, 1/2-WATT



(Continued to page 252)



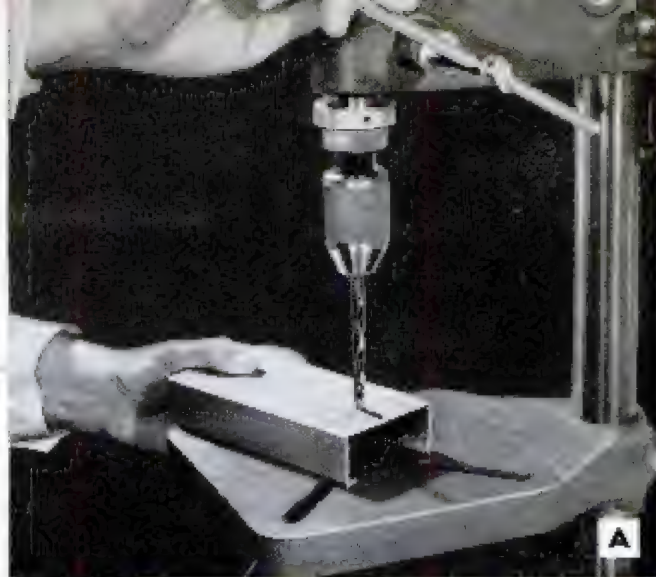
Tools for Radio Students and Experimenters

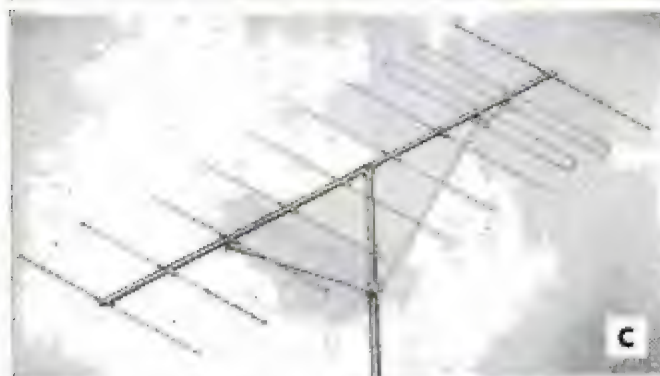
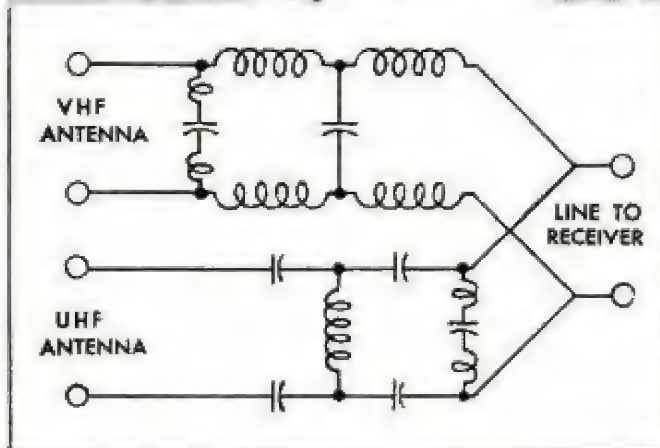
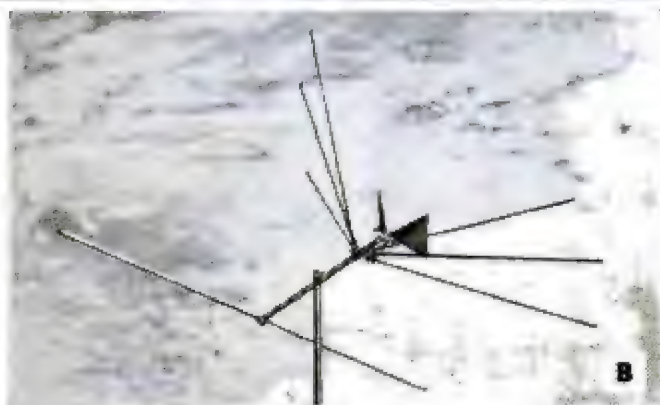
SPECIAL TOOLS are seldom required in radio experimenting and ordinary classroom projects, however there are a few that are great timesavers and they enable the worker to do a better job.

The efficient, inexpensive, bench-type drill press shown in photo A takes up very little room on the workbench and is a great timesaver in drilling the many small holes necessary for mounting parts on chassis bases. If the holes to be drilled are slightly larger than the usual $\frac{1}{4}$ -in. drill bit, enlarge them with a tapered reamer of the type shown in photo C.

When still larger holes are required for mounting tube sockets you can cut them with standard-size chassis punches like the one shown in front of the metal base in photo C. These chassis punches will cut holes in metal chassis up to $\frac{1}{8}$ in. thick. For sizes $1\frac{1}{2}$ -in. and smaller, first mark the chassis at the desired location with a center punch or ice pick. The punch shown in photo B is an automatic variety handy for marking thin-metal bases. A hole $\frac{1}{2}$ in. larger than the drivescrew in the punch is then drilled in the chassis. Then the screw is inserted through the die and hole in the metal chassis. All that is necessary to cut the hole is to turn the cap screw with an ordinary wrench. These punches come in a variety of standard sizes. Most commonly used are the round-hole sizes $1\frac{5}{32}$ in. and $\frac{5}{8}$ in. The larger size is for standard Amphenol tube sockets and outlets; the smaller for the miniature-tube bases. Square-hole punches also are available.

Instant-heat electric soldering guns like the one shown in photo E are now in common use by radio and TV servicemen and experimenters. They heat in about five sec. and cool rapidly. Screw-holding screwdrivers of the type shown in photo D are handy for holding the screw on the bit of the screwdriver in hard-to-reach places.





TELEVISION TODAY

TELEVISION ENGINEERS are constantly on the alert to develop new equipment to meet the demands of this fast-moving industry. Responding to the need for equipment with increased mobility to facilitate close-ups from ringside level during fight telecasts, the engineers at CBS have designed the small portable camera unit shown in photo A. This unit houses the image orthicon, a tube removed from the standard CBS TV camera, with its necessary controls. The remote "mother camera" is connected by means of a cable.

Unusual TV-antenna systems are being developed to combine receiving facilities for the new UHF channels with the present VHF channels. The array shown in photo B covers channels 2-83. To differentiate the UHF spectrum from the VHF this system uses the filter network shown in the diagram. It consists of a high-pass and low-pass setup, which isolates the VHF antenna from the transmission line for the UHF "bow tie" antenna. This system works in reverse for the VHF antenna.

The 10-element TV antenna for fringe areas, illustrated in photo C, incorporates eight directors, a two-diameter driven element and reflector. The single bay is claimed to have a gain of 11 db.

Photo D shows a table-top indoor TV antenna in the form of a model boat. A tuning condenser and the movable boom are claimed to provide perfect impedance match for any TV set.

Automatic impedance matching is the function of the small unit attached to the TV-antenna mast in photo E. The manufacturer claims the device will give a perfect match, thus increasing signal strength on all channels. Photo F shows an engineer at Bell Telephone Laboratories testing a new coaxial-cable system capable of handling 600 telephone conversations and one TV program in each direction over the same pair of coaxial tubes at the same time.



"Sorry, Joe. I don't lend
my tools to anybody."



"Nothing personal, understand. But you should have learned long ago to build your kit around good tools.

Look at those Bonney tools of mine. Cost less than you think, and for my dough the best any mechanic can buy.

If you're short of cash right now, get yourself some BON-E-CON* wrenches. They're real mechanics' tools with the regular Bonney guarantee, and priced so that an apprentice can afford them.

With those as a starter, before you know it you'll build up to a kit like mine."



* The new Bonney
economy-priced line

Remember. Your local Bonney Jobber, as well as Bonney, stands behind the tools you buy. He has Bonney tools priced to fit your needs as well as your pocketbook.

If You Make Painting a Hobby-



You'll get a lot more real satisfaction and pride of ownership out of a home that is clean and neat and trim in a fresh coat of paint! Pays its own way by improving your property, too!

Because Archer Pol-mer-ik contains polymerized oil, it gives you a tougher, more durable paint film than ordinary linseed oil. When you reduce your paints with Pol-mer-ik, they brush easier, level better, and give you a smoother, dirt-resisting finish. Wonderful brush conditioner, too!

Handiest single product in your house or shop. Does the job of a dozen specialized products. A few of

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Clinic for Homemakers



As a service to our readers in solving the hundreds of problems pertaining to a home—inside or out—the editors of *Popular Mechanics* invite you to present your problems to The Clinic Editor for help and advice. Address your questions to The Clinic Editor, *Popular Mechanics Magazine*, 200 East Ontario Street, Chicago 11, Ill.

Removing Copper Stains

Q—I have bronze screens on all the windows in my home, which is of brick with concrete window sills. The sills are badly stained a greenish color and the screens have turned dark colored, particularly near the bottoms. It seems impossible to remove the stains on the sills by any ordinary means. I tried scrubbing the concrete with various washing solutions with little or no success. Do you have any suggestions?—T. W., Wash.



A—The removal of copper, or bronze stains from concrete sills is not simple. You do not say how many windows are affected, but a thorough job of cleaning several sills involves considerable labor and time. This immediately points up the question of whether it is worth-while. However, if you wish to undertake the job, one of the simplest ways of removing the stain is to dry-mix ammonium chloride, 1 part, and powdered talc, 1 part. Stir in sufficient ammonia water to make a paste. Apply the paste to the stained areas with a wide putty knife and allow to dry. When this is washed off most of the stain will come with it. On some areas where absorption is greater, two or more applications may be necessary. Recurrence of the stain can be prevented, to some extent at least, by coating the screens with a half-and-half mixture of linseed oil and turpentine or clear plastic of the type supplied in a pressurized container.

Condensation on Windows



Q—Why do the windows in my home sweat during cold weather? I have hot-water heating, the outside walls and ceilings are insulated and the windows have wooden sash frames, yet we are troubled all winter long with moisture running down the panes and staining the paint. Is there any cure for this trouble?—S. A., N. Y.

A—The simplest explanation, although it does not state the causes in their entirety, is that the window pane is colder than the air in contact with it on the room side. Moisture in the air condenses

(Continued to page 236)

choice of the

champs!



Evie Wolford



EVINRUDE BIG TWIN

"America's finest outboard motor"

says Bruce Parker, National Water Skiing Champion

"No sport tests a motor like water skiing. I've tried them all, and Big Twin is the answer on every count. This motor powered me to eight 1952 titles, and Big Twins are used exclusively at the Bruce Parker water skiing schools in Amityville and Nassau. These motors have piled up thousands of hours of top speed towing and delicate maneuvering, with constant gearshifting for pick-ups and take-offs.

Big Twin is America's finest outboard motor."

Big Twin's superb performance is yours at *lowest cost per horsepower* in the outboard field. It's America's top choice for powering runabouts and big family boats, fast fishing craft and cruisers.

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"Outboard Motors" in the yellow pages of your phone directory.

Catalog Free—write today for full-color catalog of the complete Evinrude line. EVINRUDE MOTORS, 4159 N. 27th St., Milwaukee 16, Wis.

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BIG TWIN, 25 H.P.* Gearshift with neutral, forward, reverse. Cruis-a-Day Tank. Engineered for quick attachment of new Evinrude Simplex Remote Controls. **\$390**

SUPER FASTWIN, 15 H.P.* New straight through—dazzling performance—only 67 lbs. Quickly attachable Simplex Remote Controls at moderate added cost. **\$325**

FLEETWIN, 7.5 H.P.* Only 47 lbs. The favorite for family and fishing boats. Duo-Clutch and Safti-Grip Drive. **\$210**

LIGHTWIN, 3 H.P.* 32 lbs. Built with famed Fisherman Drive—lets you go "wherever there's water to float your boat." **\$145**



Here is Bruce Parker and his trophy-laden troupe at the '52 National meet, American Water Skiing Association, Minocqua, Wisconsin. (From left) Barbara Goode, Eastern Girls' Champion; Bruce Parker, National Senior Champion; Evie Wolford, National Slalom Champion; Jim Myer, Eastern Boys' Champion. In '52 Big Twin powered Bruce to 8 titles. His skiing partner, Evie



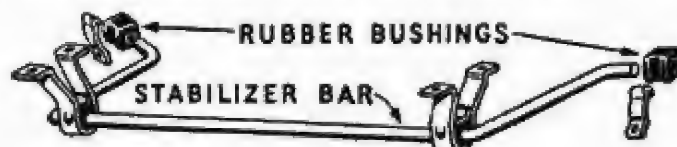
Care and Feeding of Engines

BY S. P. CORP

HARD STEERING, SIDESWAY, AND RATTLES

If your car is small, you have a stabilizer bar at the front. If it is large, you have stabilizers both front and rear. Stabilizers are used to offset the tendency of any car to lean outward on a curve, as weight shifts to the two outside springs.

Looking under the front, you will find this bar attached to the frame side members, with ends bent toward the rear forming lever arms. It is mounted in rubber bushings, both at the frame and at the lower support arm.



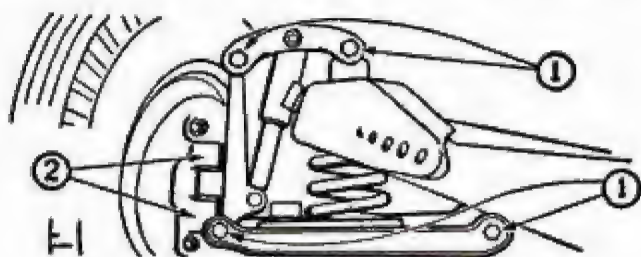
[FRONT STABILIZER BAR]

When these bushings deteriorate as a result of excessive lubrication and road shock, your car will steer harder, there will be more sidesway, and you may develop an irritating rattle, especially on rough roads. If your car has a rear stabilizer, it is subject to the same trouble.

To end the trouble, replace the rubber bushings!

KING PINS AND TIRE WEAR

Months of winter driving may have caused slush, ice, and salt to penetrate front wheel suspension parts, causing wear and affecting alignment, which causes tire wear.



FRONT WHEEL SUSPENSION

Right now is a good time to inspect these parts—(1) the threaded bushings of upper and lower control arms, and (2) the king pin bushings and pins. Replace them if worn.

BEST BET FOR RING REPLACEMENT



Sealed Power KromeX Ring Sets are your best bet for double mileage when you re-ring your engine. Sealed Power chrome rings are used as original equipment by 23 leading engine builders. Only Sealed Power KromeX Sets have the famous MD-50 Steel Oil Ring, with the Full-Flow Spring. Write for your free copy of "MORE POWER, Less Oil, Less Gas," a valuable illustrated manual on car care. Sealed Power Corporation, Dept. G-4, Muskegon, Mich.

(Continued from page 234)

on the cold surface of the glass, the amount of the condensate varying with the humidity of the air in the room. There are a number of sources of water vapor in the home which may combine to keep the humidity at a constant high level, especially during winter months when doors and windows are kept closed. Ordinary daily activities such as cooking, bathing and laundering may release as much as five to seven lb. of water daily to the air in the rooms of the average home. This moisture, contained in the air in the form of vapor, will condense on any surface which has been cooled below the dew point. This may be on the window panes, as in your case, but also may be on the walls and ceilings, floor joists in basementless homes and nail heads, rafters and roof boards in attics. Storm sash will help to minimize condensation on the window panes. Storm sash should be sealed with felt strips and attached with turn buttons rather than hangers. In some cases it is necessary either to weather strip the inner sash frames or seal them with adhesive tape to prevent leakage of warm air.

Downdraft in Chimney

Q—My home is built in the open, the nearest trees and buildings being more than 300 ft. distant. The top of the chimney is more than 4 ft. above the roof ridge, yet I am troubled with downdrafts in both the fireplace and furnace flues. These are strong enough at times to bring soot and dirt into the room from the fireplace and sometimes there are noticeable fumes from the oil burner. What can be done to prevent this condition?—B. Y., Kans.



A—Of course, it's not possible to be certain at this distance, but we'd guess right away from your description that air is being drawn down the chimney flues because of what in effect amounts to a slight variation in air pressures inside and outside the house. Most types of heating equipment require fairly large quantities of air for complete combustion of fuel. Tightly built, insulated homes frequently become "airlocked" to such an extent that fresh air does not infiltrate as fast as it is consumed by the heating equipment. This in combination with a cold chimney, results in the creation of a downdraft in the chimney flues. Although the simplest remedy is to admit more air through an open door or window, a better method is to bring air from outside to the furnace by means of a small duct. If this is done you probably will experience no further trouble with the fireplace.

Estimating Required Amounts of Wallpaper

Q—I want to repaper my home both upstairs and down. How do I estimate the amount of wallpaper required?—A. Y., Ga.

A—In some homes it is difficult to estimate total requirements accurately but it is probable that the following table will be of help to you:

Size of room	SINGLE ROLLS Height of Walls (rolls req'd.)		Border (yards)	Ceiling (rolls)
	8 ft.	9 ft.		
8x12	10	11	15	4
8x14	11	12	16	4
10x14	12	14	18	5
10x16	13	15	19	6
12x16	14	16	20	7
12x18	15	17	22	8
14x18	16	18	23	8
14x22	18	20	26	10
15x16	15	17	23	8
15x18	16	18	24	9
15x20	17	20	25	10
15x24	20	22	30	12

Note—Amounts specified are over the actual requirements to allow for trimming and wall irregularities. Deduct one roll for each door or window of average size.

**Here's a job you
can do yourself**



Finish your attic with **ARMSTRONG'S TEMLOK**

Here's the practical and economical way to expand your home. Build a comfortable extra room in your attic with walls and ceilings of Armstrong's Temlok Plank and Tile. It's an easy job . . . one you'll enjoy doing yourself.

Armstrong's Temlok is a sturdy wood fiber material that builds, decorates, and insulates. Both Temlok Tile and Plank have the exclusive "Lok-Bevel" joint. This tongue-and-groove type joint conceals the nails or staples that hold the material in place and insures a tight, level surface.

Temlok's smooth factory finish is ironed on. Temlok Plank comes in a soft random coloring called "Suntan Blend." Temlok Tile is finished in both Snow White and Light Ivory.

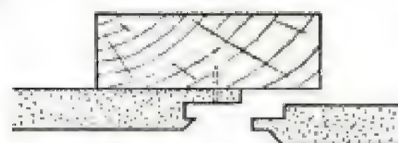
Ask your lumber dealer about Armstrong's Temlok. He'll show you samples and help you plan your job. For the free booklet, "New Ways to Remodel an Old Home," write Armstrong Cork Company, 9004 Ross St., Lancaster, Pa.



Nail 1" x 3" wood furring strips on 12" centers over the framing members. For extra insulation, staple Armstrong's Insulating Wool between knee wall studs and rafters.



Staple Temlok Tile or Plank to the furring strips. Shim if necessary for level surface. Stapling usually permits more rapid application, although nailing is equally effective.



The Lok-Bevel joint conceals the staples and makes installation easy. It also allows for seasonal expansion and contraction, preventing unsightly open gaps at the joint lines.

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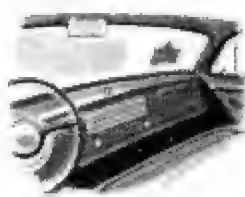
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TIPS FOR SHOELACES. When metal or plastic tips break off laces, form new tips with "Duco" Cement.



A WATCH CRYSTAL won't keep popping out when you use transparent "Duco" Cement to hold it in place.



INDOOR TV ANTENNAS won't mar polished surfaces when felt bases are attached with "Duco" Cement.



NAME PLATES IN OVERSHOES prevent mix-ups in the school coatroom. Put them in with "Duco" Cement.



REPAIR CHIPPED GLASS. The transparency of "Duco" Cement makes the repair neat—almost invisible.



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FAVORITE FOR 25 YEARS



BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

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(Continued from page 10)

To the Editor:

In your February issue you have incorrectly called the car at the bottom of page 132 a 1911 Cadillac. It is a Mercer circa 1921 owned by Jos. Murchio of Greenwood Lake, N. Y.

C. W. Reed,
Glen Ridge, N. J.

Rebuttal

Some of our readers have taken sharp issue with the expressions of the three Detroit automotive engineers whose interview appeared in the February issue under the title "American Engineers Look at Foreign Cars." To give the sports car and foreign enthusiasts their "day in court" we publish as rebuttal the following excerpts from their letters to the editor:

* * *

I am an American-born citizen but occasionally I get really exasperated with the smug complacency of Americans. We are quite happily convinced that nothing made anywhere else in the world is worth-while. Nowhere was it better illustrated than in this article in which three engineering experts sit in judgment—actually on themselves! I say, in judgment on themselves, because the fruits of their own efforts had to be brought into comparison to justify the statements of Messrs. Graves, McCauley and Walker.

R. C. Nicholson,
Master Rule Co., Inc.,
Middletown, N. Y.

* * *

I learned auto engineering in Belgium and used to see all makes of cars. I don't understand these gentlemen; this is the funniest thing I ever read about European production. I guess they never drove in a Hotchkiss or Delage, Austro Daimler, Mercedes Benz, Adler, Hanomag or Hispano Suiza. I can assure you that these automobiles are really beautiful and they could match any American cars.

Rene P. Veroul,
Los Gatos, Calif.

* * *

The best thing I can say about this article, in an otherwise fine magazine, is that it is provocative.

Dick Fancher,
Fairfield, Calif.

* * *

Having lived in France for three years and being an avid automobile enthusiast, I feel I am sufficiently acquainted with

(Continued to page 242)



A little film goes a long way

Uses economical 8mm. roll film with easy, no-thread loading. Enough film in each roll to shoot 30-40 average-length movie scenes!



Movies rain or shine

Your choice of an $f/2.7$ lens . . . plenty fast enough for cloudy-day shooting . . . or a super-speedy $f/1.9$ job that can see in the rain. Both Lumenized (hard-coated), of course.



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CINE-KODAK RELIANT CAMERA

With $f/2.7$ lens, \$82.30

With super-speedy $f/1.9$ lens, \$102.25

Prices include Federal Tax and are subject to change without notice.



Telephoto for long reach

It's an accessory 3x to let you come up close on those hard-to-reach shots. View finder shows fields for standard or telephoto lens.



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Die-cast aluminum body is built to take it. Your "Reliant" thrives on rough going—yet it's sweet-running as a custom-made reel.



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Gets wonderful full-color movies as easily as black-and-white. Inexpensive, too, Kodachrome movie film costs only \$3.95 a roll . . . complete . . . ready to show!

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Really cuts fast action down to size. Use it with any film, either lens, for those extra-detailed effects.



Slips in a pocket

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See "Photographic Equipment and Supplies"

See the "Reliant" at your Kodak dealer's. He'll be happy to help you choose the model that's right for you, the $f/2.7$ or the $f/1.9$. Either way you're getting "tops" in movie-making enjoyment. Other Kodak movie cameras from \$42.50.

Kodak

Trouble Shooters for the TV Skyway

(Continued from page 135)

of the high Des Moines tower. Somehow, they heard about the little sick boy lying in a hospital near by, watching their every movement with avid eagerness. One evening, they arrived at the hospital in a group to call upon their young admirer, presenting him with a red tin hat (the badge of a gang foreman) and an elaborate Erector set with which he could build his own relay tower.

Outwardly, they're just average guys. Take Merle Newton, for instance. This busy technician, with a tinge of Kansas in his flat drawl, is on intimate speaking terms with every coil of wire behind the meter panels in the Denver office. With him in charge, no little microwave is going to get far out of step. Newt showed us a microwave transmitter, carefully pointing out how each of its three "stairstep" stages is separately tuned in this grounded-grid amplifier. He also explained the C1-Alarm bay.

"The relay points," he said, "are unattended except for our routine monthly checkups, or unless there's trouble. Ordinary telephone lines connect each station with its alarm center. One of the cleverest tricks of the whole system is the "unseen stool pigeon," a mechanical tattletale which

lets us know immediately if anything is wrong, even tells us if the room is too warm or that the front door has swung open. Over 25 trouble indications can be reported back to home base. For instance, if we've blown a fuse in one of the circuits somewhere in this territory, this robot indicator from a station, such as Buckhorn, gives us a trouble signal on the C1-Alarm bay here in Denver, causing it to light up like a Christmas tree and starting its bells to ring. One of the attendants, constantly on duty, quickly pushes a series of buttons and rescans the alarm trunk by automatic step switches, and first thing you know he will locate the trouble area and dispatch a crew to fix it."

"It's possible," added Newt, "for any plant to operate for three or four weeks when power lines are down, falling back on its emergency 20-kilowatt diesel-generator supply. The equipment uses heavy-duty storage batteries to supply the filament and plate power. A charging current is furnished by a rectifier normally connected to commercial lines."

In order that we might see for ourselves the inner sanctum of one of these stations, Newt took us over the rugged road to Buckhorn Mountain, where two men had been working on a temperamental rectifier's insides for two weeks. Leaving Fort Collins,

(Continued to page 244)

give your hair that **"JUST-COMBED"** **LOOK** all day long

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GRAFLEX® *Prize-Winning Camera*

(Continued from page 238)

European designs to see both sides of the picture. This article was nothing but a conglomeration of misstatements, exaggerations and contradictions. . . . Ask Mr. Graves how many 327-cubic-inch Packards have run out of road trying to chase a little 74-cubic-inch MG through a few good corners. And if he is under the impression that coil springing is as effective as torsion bars for roadholding, has he ever seen a big American car lean and sway through a shallow curve at a good speed? There is much to be learned on both sides of the ocean. Give credit where credit is due. If Detroit would get out of its present rut and give the people the facts, American cars could be much better built, safer and more economical, and yet retain most of the genuine advantages of our present designs, without the chrome-plated glitter that is today's excuse for quality.

T. Balfour, Cpl., USMC,
Control Tower, MCAS,
Quantico, Va.

* * *

We are writing you in regard to the ridiculous piece of trash, "American Engineers Look at Foreign Cars" in the February issue. What sort of morons do you take your readers to be? We have always been of the opinion that *Popular Mechanics* has been for mechanically minded persons. That article must have been printed for the benefit of people who know nothing about automobiles and cannot detect that it is totally absurd.

Here are our opinions on the matter of American automobiles:

There would be a good market for a small car in the United States if a better and cheaper car than existing European models could be made. No one enjoys driving an American inverted bathtub on wheels in heavy traffic.

Cars should be made shorter and narrower to aid in parking and in traffic.

The public in general is interested in gasoline economy. With gas prices what they are today, no one likes to unnecessarily waste fuel.

We would certainly rather have a noisy engine in a superior frame than a quiet one in an inferior frame. We would rather be uncomfortable and alive than luxuriously dead. Not all foreign cars are noisy.

A Bentley surpasses a Packard in every detail. In body work, for example. Why should one not use the clutch? Performance *should* be emphasized. The American public cannot be sold on hot-rod tactics because there is not a car made here today,

(Continued to page 248)

MOST USEFUL TOOL FOR YOUR SHOP



Cleaning . . .

Buffing . . .

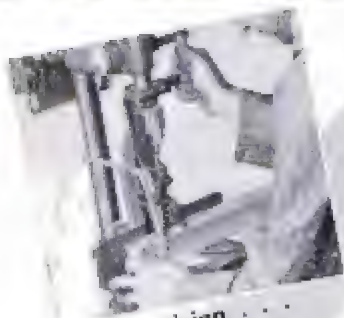
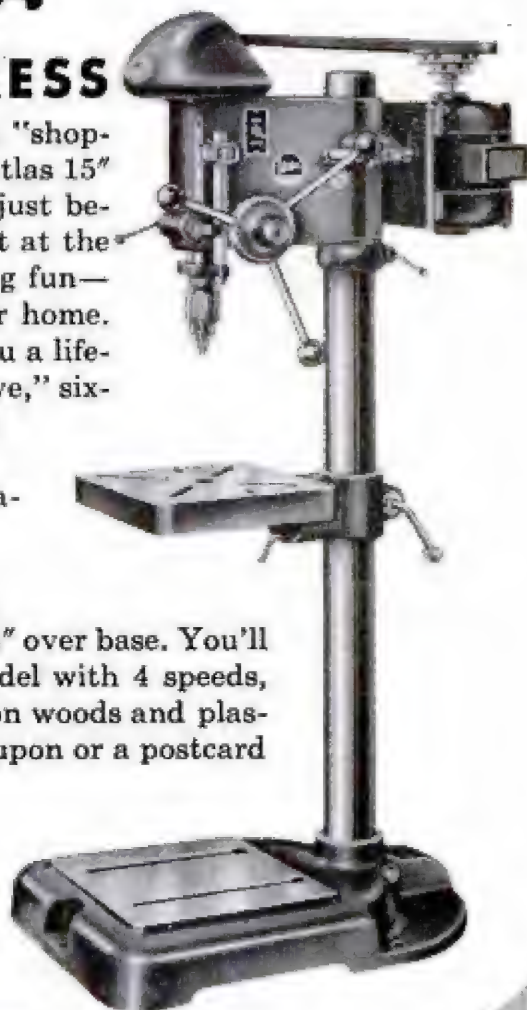
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And the Atlas is built to last you a lifetime—with exclusive "floating-drive," six-splined spindle, steel drive sleeve, 4 sealed-for-life ball bearings, new exclusive depth control stop, extra-heavy head, table, column, and base for accurate work.

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CABLES IS
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Bowes "Seal Fast" battery cable terminals positively will not corrode, and are specially engineered to fit the battery posts snugly, assuring longer cable life and full power from your battery. Stop battery cable trouble before it begins . . . and . . . increase the life of your battery. Your Bowes dealer can supply you.

BOWES "SEAL FAST" CORP., INDIANAPOLIS 7, IND.
BOWES PACIFIC CORP., RIVERSIDE, CALIF.

we crossed the winding Poudre River and jolted higher and higher up Rist Canyon until we reached the top of Buckhorn.

Newt pointed out the four big antennas at each corner of the platform on top. "A transmitting and a receiving horn are needed for each direction," he told us. "These metal-lens antennas, made of aluminum alloy and weighing about one ton each, make it possible to focus the microwave like a searchlight beam."

The white cement-block building in its stark simplicity might have been a set for the latest Space Patrol episode. Inside, everything was the same battleship gray. Four large line-ups, eight bays in each, formed a simple crisscross design, with paths between, in the square room. Just the whir of a ventilating blower broke the quiet voices of the two shirt-sleeved men, working over one of the panels.

Newt explained, "When there's trouble on one channel, causing TV to fail between Denver and Rawlins, say, the whole section is switched to the spare circuit while the crew is fixing whatever's wrong. The channels are intact all the way through. Remember, microwave relay stations aren't exclusively for television. There are six channels now, three in each direction. One is assigned to telephone. Right now there are 228 two-way telephone-message circuits passing through here, and soon we'll up it to 600. Then, of course, one channel is for television, and the third is the protection circuit, which switches in automatically if there's trouble on the telephone channel. On TV, it has to be done manually. Soon, we expect to have two more channels, and in another year or so, we'll have 12 in full operation. Then each of the major TV networks can have a circuit to itself and won't have to share the microwave. At the present time, the television sound is transmitted over special long-distance-telephone cable which has single side-band carrier circuits, arriving at the same time as the picture, with perfect synchronization between the two.

"Once a month," he continued, "we go out to routine the channels at the five relay points in the Denver area. A channel consists of a receiver and a transmitter and we test every part to be sure it's in proper working order. First, we check the filament and plate voltage of the 416A amplifier tubes. These electron tubes for superhigh frequencies are constructed to extremely precise standards. The transmitting side has four and the microwave generator has two, making a total of six in each channel. Then we sweep the bay. We get a release from the control point, taking the channel out of

(Continued to page 246)

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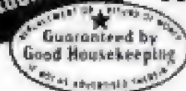
Yes, you can save \$25, \$30 or more on every room by installing Aristoflex yourself. It's easy, too, with MATICO's tested install-it-yourself method—special tool kit—and illustrated instruction booklet. And you can install Aristoflex in any room from basement to attic because it's rugged vinyl-plastic throughout — there's no felt backing to wear off or deteriorate.



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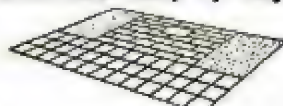


around this scientifically designed steel form which also provides circulating heat and assures perfect Fireplace operation.

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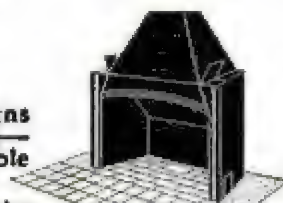
Foundation

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Beautiful fireplace designs modern and conventional—shows artistic use of available material.

Enjoy circulating heat and the radiance of an open fire in your Home, Playroom, Cottage or Camp.



Fireplace form set on foundation includes firebox, damper, down draft shelf and smoke dome.



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service to make a gain-frequency test. We loosen the quick clamps at the receiving end of the channel and insert an attenuator in the guides. Then by means of a transducer and a flexible coaxial lead, we feed a test signal through the channel and check the output. This is to determine that the amount of amplification provided meets certain limits."

Newt added, "We service the stations late at night after television signs off. Reaching such points as Buckhorn and Mount Rose, Nev., where snow can drift 10 feet deep as early as October, would be next to impossible without the aid of Jeeps, Sno-Cats, and the latest vehicle to be developed, the Sno-Shu. This custom-made machine, with its cleated rubber treads, can cling stubbornly to the steepest grade without turning over."

Our feeling of meeting something too great to have sprung from mortal mind remained, and yet we realized that holding microwave down to earthly reality are these men who service the sky pathway, breathing life blood into the cold veins of power generators, receivers and transmitters and making a fantastic accomplishment believable to the average man. ★ ★ ★

Hydraulic Tire Breaker Made From Aircraft Parts



If you've ever tried to break an automobile tire from its rim, you'll approve of a hydraulic breaker invented by an Air Force mechanic. A welded-steel framework rests on the tire, its wedge-shaped legs encircling the inner rim. Two thousand pounds of pressure is exerted on its center by an actuating cylinder salvaged from an F-47 landing gear. Pressure comes from a B-24's hydraulic accumulator and pump. A 24-volt auxiliary power unit activates the device. The force pops the tire from its rim.

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with one or two exceptions, that can take such maneuvers without falling apart.

There is no need to have such soft springs. Comfort can be sacrificed for the safety of a stiffer suspension system.

Slow steering with absurd ratios of 25-30 to 1 would not be necessary if those supermush tires were not used.

We feel that a relaxing ride adds to the danger by lulling the driver to sleep. A few jounces would keep the driver alert and on the job.

Any sports car can corner better and faster than an American stock car. Also, the inevitable tire squeal will not be present and the sports car will not lean over so much.

Power steering is for people who are too lazy to spend a little effort steering and who should not be driving. What if the power steering failed? Cars are also too front-heavy today. An American car today will pitch up in the rear during heavy braking due to this fact.

Wire wheels just for sparkle at more than \$100 a set are stupid and a waste of money.

Emphasis should be on mechanical features first, and on styling second. American styling is nothing to brag about.

America has much to learn stylewise and engineeringwise from Europe. We admit that American cars may be the first to offer automatic light dimmers and refrigeration systems, but these are only accessories and do not have anything to do with the operation or beauty of the car.

Where engineering counts is performancewise. Why is it that European engineers can get 125 horsepower out of a 91-cubic-inch engine?

We present the following points against American cars in general:

One of the worst defects in American automobiles is the very shoddy workmanship. A very poor feature is the supermush suspension system which would be dangerous enough with standard 35-pounds-per-square-inch tires, let alone 24 and 22 doughnuts. . . . These automatic transmissions are about the biggest insult to a mechanically minded person that is possible.

The chrome trim is the biggest waste of money imaginable, for it serves no purpose whatsoever, and it seems to have been splashed about without any rhyme or reason as if to take up the entire chrome production.

We also fail to see how any reputable auto manufacturer can make or put his name on some of these so-called "sports

(Continued to page 256)



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Enclosed find 10¢ for booklet, "Beautiful Wood for Beautiful Homes," showing ideas in full color for beautiful Weldwood paneled rooms.

Name _____

Address: _____

City _____ Zone _____ State _____



We're sitting pretty...for petty cash!



**\$110 worth of lawn
furniture for only \$47*
built with my**

SKIL Home Shop Drill

My SKIL Home Shop Drill made our yard the favorite summer spot for all the family. And I saved almost 60% on the lawn furniture I built with SKIL-Chart No. 112.

My SKIL Drill made fast work of drilling and countersinking all the holes for bolts, dowels and lacings. The SKIL Drill handles easily even in close quarters, because this drill is compact, light weight, perfectly balanced.

You'll also do sanding, polishing, buffing, brushing and grinding... get dozens of "bonus uses"... with your SKIL Home Shop Drill and SKIL accessories. Start now to save time and work by using a SKIL Home Shop Drill for all your carpentry and hobby projects. And use the coupon now to order your SKIL-Chart No. 112.

SKIL Home Shop Drill Model 549—The only $\frac{1}{4}$ " drill of its power and price with preferred, sure-gripping geared chuck. Weighs only $3\frac{1}{2}$ lbs., yet drills $\frac{1}{4}$ " holes in steel, $\frac{1}{2}$ " in hardwood. Priced at only \$23.25. Model 518 with popular hex-key chuck, only \$20.50.



*For materials in 4 units shown. Costs vary locally. Tool prices subject to change without notice.

SKIL
HOME SHOP TOOLS

Made Only By SKIL Corporation
Formerly SKILSAW, Inc.
5033 Elston Ave., Chicago 30, Ill.
In Canada, Skiltools, Ltd.,
3601 Dundas Street West
Toronto 9, Ont.

SKIL Corporation, Home Shop Division, Dept. C-43
5033 Elston Avenue, Chicago 30, Illinois

I enclose 10¢ in coin. Please mail SKIL-Chart No. 112.

Name _____

Street _____

City _____ State _____

"Antiques" From a Modern Shop

(Continued from page 164)

as were the originals which were made in England in 1760, and are equipped with locks and handmade brass handles and escutcheons. The caddies are popular as containers for cigarettes, tobacco, cards, jewelry and other small articles. Works has put one of the larger caddies to a use few purchasers are likely to imitate: He made a wren house of it which—since the caddy retails for around \$25—makes it just about the most ritzy home a wren could find. "Something went wrong with that one," the maker explains.

One of the most complicated products of the shop is a hurricane candleholder which, together with its mouth-blown glass globe, stands over 16 inches high. Its stem and base, essentially the same as a conventional candlestick in form, fit together like a nut and bolt. Works does the threading with an old-time tap and screw-cutting box. He says that such a threaded joint is the only kind that can be drawn tightly together, yet can be taken apart at any time without difficulty. He turns base and stem individually with hand tools and lathe. Brass and glass parts are made by other manufacturers.

Here's the customary way he finishes the mahogany reproductions: First he applies stain to make the wood the color of 200-year-old mahogany. After the stain is dry he applies filler of the proper color, rubs off the excess, lets it dry thoroughly and sands it smooth. He sprays on finishing coats of clear lacquer and, when dry, hand rubs the finish to the desired sheen with lacquer-rubbing compound.

Here are some typical price tags: Octagonal tea caddy, \$19.75; oblong tea caddy, \$24.90; small mahogany tray, \$6.95; and an 18-inch round mahogany tray, \$16.75.

In Works' home are to be found reproductions that are worth even more, but which he never will offer for sale. These include experimental tea containers and other pieces made of cherry, rosewood, pine and other woods different from the materials used in the originals. ★★★

Dial Shows Battery Condition

Connected to the battery terminals, an electrical instrument that mounts on the dashboard shows the battery condition and state of charge at all times. It tells the driver when the battery is taking a charge, holding its charge and how the voltage regulator and generator are working. It also shows the condition of the starter and the power consumed under starting load. Instrument does not draw power from battery.

Protect your cooling system now
to guard against summer overheating

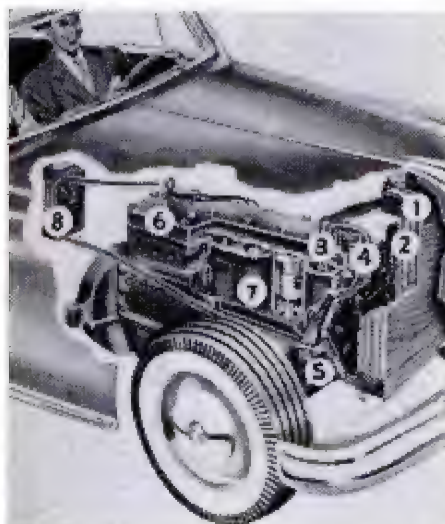


Cooling system failure—on the New York Southern State Parkway last summer—stranded these motorists.

NEW DU PONT ANTI-RUST

and Water Pump Lubricant

RETARDS RUST FORMATION, NEUTRALIZES CORROSIVE ACIDS



HERE'S WHERE Du Pont Anti-Rust works in your car's cooling system to neutralize acid, retard rust and corrosion, lubricate moving parts.

1. Radiator tanks.
2. Water tubes.
3. Thermostat.
4. Water pump.
5. Hose connections.
6. Cylinder head.
7. Cylinder wall.
8. Heater.

Just pour it in the radiator, leave it in!
Now, you can easily eliminate one hot-weather worry—failure of your car's cooling system. Most overheating is caused by clogging due to rust, and corrosive attack. New Du Pont Anti-Rust not only inhibits rust, but neutralizes acids and lubricates the water pump as well.

Best of all, liquid Du Pont Anti-Rust is simple to use. Just pour it in your radiator and forget it. It starts immediately to protect you against troublesome breakdowns and costly repairs. And Anti-Rust can't clog . . . is harmless to hose or metal parts. Get it at your service station or auto supply store—\$1.00 at most dealers.



Better Things for Better Living
... through Chemistry



DU PONT SPRING DRAIN-OUT:



Ask at your garage or service station about this complete summer protection. The service includes 1. Draining out winter-worn anti-freeze. 2. Thoroughly cleaning out rust and scale with Du Pont Cooling System Cleanser. 3. Adding Du Pont Anti-Rust and Water Pump Lubricant. 4. Checking all cooling system parts.

DU PONT COOLING SYSTEM **CLEANSER**

ENTER **\$1,000.00** CASH **SYNCRIO SANDER CONTEST** IT'S FUN! IT'S EASY!

**NOTHING
TO BUY!**

WIN
One of
These
43
CASH
PRIZES

1st Prize
\$500
2nd Prize
\$200
3rd Prize
\$100
40 Prizes
\$5 Each!

Contest
STARTS
MARCH 1
ENDS
MAY 31, 1953

JUDGES
WALT DURBAHN
Master Craftsmen,
TV Star
RUSSELL JOHNS
Publisher
HARRY J. HOBBS
Publisher

SYNCRIO
ELECTRIC
SANDERS

SYNCRIO CORPORATION

CONTEST DEPT. D-43

OXFORD, MICHIGAN, U. S. A.

Send FREE Contest Folder postpaid.

Name _____
St. & No. _____
City _____
Zone _____ State _____

\$1,000.00
Contest
Folder
FREE
AT HARDWARE
OR
SEND COUPON

HOW TO ENTER:

1. Don't buy anything—just find correct Missing Words for Jingle:

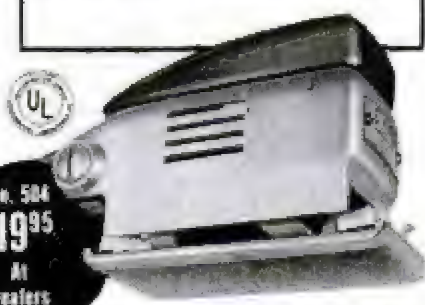
SYNCRIO SANDERS HAVE A LOT OF FEATURES OTHERS HAVEN'T GOT, S _ _ _ ER, L _ _ _ ER, _ _ _ FREE PLUS AN HONEST _ _ _ EE!

"Missing Words" are below sander picture in the type following "Syn-cro Features." Look for them now!

2. Finish Sentence: "I like SYNCRIO SANDER BECAUSE" in 15 additional words or less.

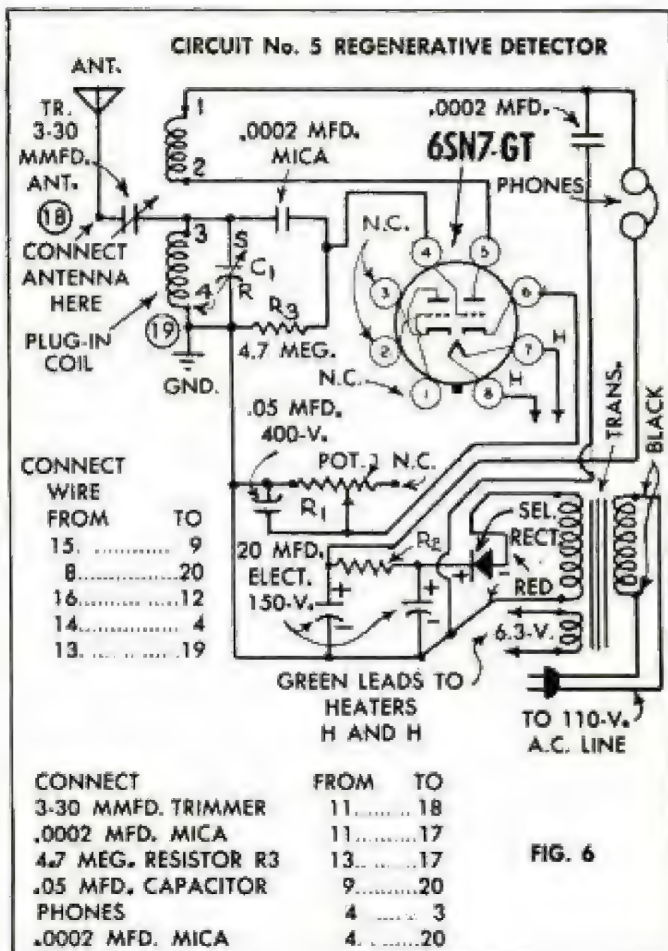
3. Give hardware store name.

ENTER NOW! Write completed Jingle, Sentence, store name, your name-address on paper—mail! or send Coupon for FREE CONTEST FOLDER—or get at hardware store! Have fun—and win!



SYNCRIO FEATURES:

Sands 10 times faster than hand-sanding. SMOOTHER finish, too! Proven best for vertical and overhead use because it is so powerful, so much LIGHTER. Syncro is the only electric sander with Double-Arc motion which cleans as it sands. Works so easily you "finger-guide-it!" Save money and TROUBLE doing your own refinishing at home with Syncro. Remember—it is the only sander giving you a GUARANTEE which says: Syncro Power Units guaranteed against burn-out all during your ownership or replaced free! Try SYNCRO at your hardware!



Six-in-One Radio Lab. Project For Beginners

(Continued from page 230)

They should be well insulated with friction tape to avoid any possibility of shock. Do not touch any clip or terminal after the line cord is plugged into the wall outlet. Always pull out the line-cord plug whenever you work on any circuit. The isolation transformer is a Stancor type PS-8415 which has a 125-volt secondary at 15 ma. (red leads) and a 6.3-volt, 0.6-amp. filament winding (green leads). Neither of these secondaries is center tapped. This transformer lists in parts-house catalogues for about \$1.70. The selenium rectifier is a standard 65-ma. type and costs about 80 cents. The potentiometer R1 is a Mallory midget-type U-48 (taper No. 1) 500,000 ohms. The ICA 4-prong coil used is from a 2-coil ICA kit that sells for about \$1.96. Both of these broadcast-band coils are useful to beginners, but the one for the high-frequency end of the band (160-325 meters) covers the entire broadcast band with the variable capacitor (C1) specified. The other coil can be reserved for more advanced projects. No power-line switch is included in the simple foundation unit in order to keep the cost at a minimum; it would add nothing to performance. The variable C1

(Continued to page 254)

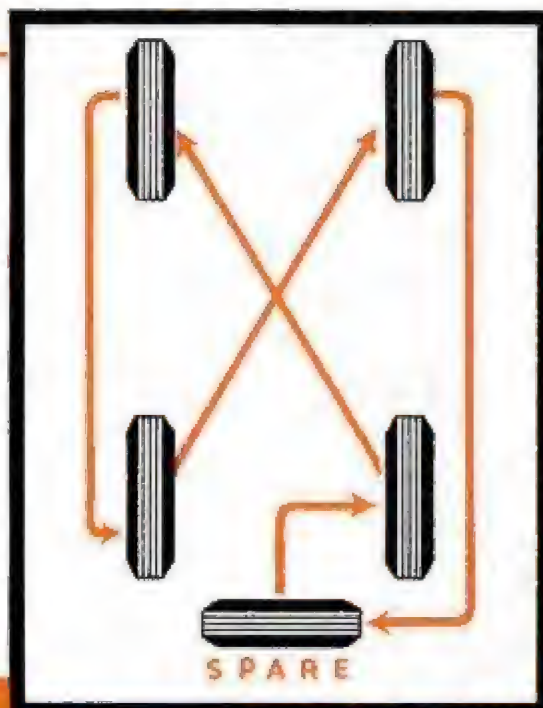


Texaco Tips

on car care

How to get longer tire life

When your tires wear unevenly, they don't give you full service. To get maximum mileage from your tires, they should be inspected often and rotated. See your Texaco Dealer for a thorough tire check. He will inspect the treads for irregular wear. He will check for trouble-making cuts and breaks . . . and fill your tires to the proper pressure. He will rotate them for a nominal fee. This helps you enjoy more miles of carefree motoring.



How to get that "cushiony" ride

Blast Marfak with a stream of water — and it stays put, won't wash away or drip off. That's why Marfak protects your car's chassis better — longer. It's scientifically made to resist the wash-away action of wet roads. And Marfak clings far longer to points of wear . . . fights squeeze-out and far-out. This means you get a cushiony ride that lasts for 1,000 miles or more. Get longer lasting Marfak lubrication today. See your Texaco Dealer, the best friend your car ever had.



THAT "CUSHIONY" FEELING LASTS LONGER WITH



THE TEXAS COMPANY
TEXACO DEALERS IN ALL 48 STATES

Texaco Products are also distributed in Canada and in Latin America

TUNE IN: Tuesday nights on television — the **TEXACO STAR THEATER** starring **MILTON BERLE**.

See newspaper for time and station.



Has Your Tongue
Been **STUNG** Lately?



NO TONGUE-STING IN YELLO-BOLE PIPES

Let the Honey Girl show you why



Don't smoke a pipe that tortures your tongue! Light up a Yello-Bole... and feel the difference. Thanks to that pure honey lining... you can smoke your Yello-Bole to your tongue's content. No "Break-In Blues!" No stung tongue or irritated throat. Switch to a cool, sweet-smoking Yello-Bole... today!

YELLO-BOLE

\$1.00 TO \$2.50

WIDE VARIETY OF SHAPES... IMPORTED BRIAR

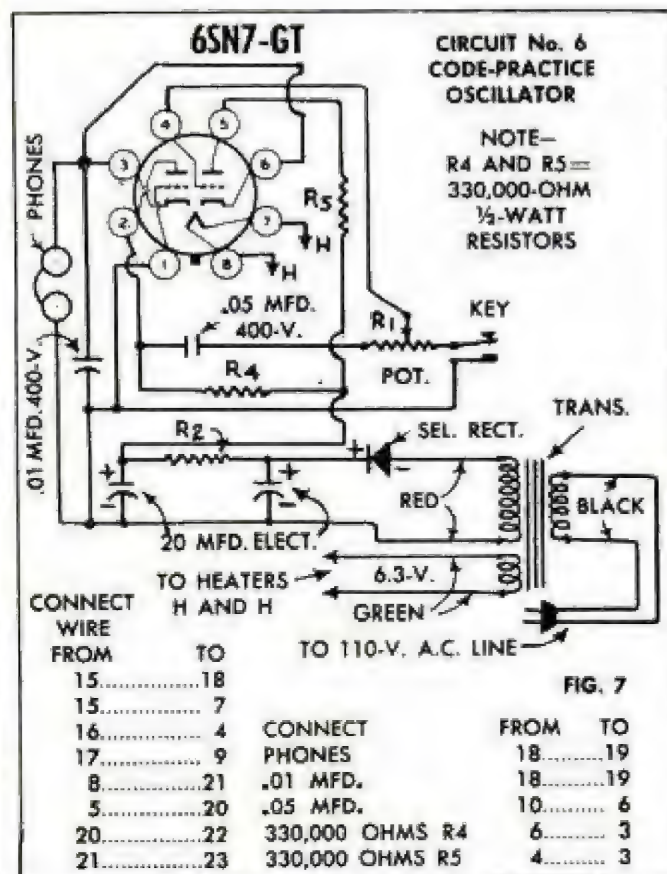
capacitor is a midget TRF single-gang 27-plate type tuning from 11.2 to 381.4 mmfd. This condenser is mounted on the foundation baseboard by means of two small angle brackets. Potentiometer R1 and the selenium rectifier are also mounted on larger angle brackets $\frac{3}{4}$ in. wide.

Label all terminals just as shown on the foundation unit, Figs. 1 and 1-A; small glue-backed labels may be used. It is necessary that each lug and clip be numbered exactly as shown so the subsequent circuits will be hooked up correctly. The various circuits numbered from 1 to 6 are shown schematically in Figs. 2 to 7. Under each circuit there are two columns of connection data. One is for connecting wires and the other is for parts, antenna and ground. The completed unit for the regenerative-detector receiver circuit No. 5 appears on page 229 and in photo A.

The last circuit in the series is a code-practice oscillator and requires the use of a key. The homemade one shown will answer the purpose; the wooden knob was obtained from a pot cover. The blade contacts the soldering-lug wood screw only when depressed. The headphones can be an inexpensive 2000-ohm pair available for about \$1.85. All parts specified can be obtained from any of the large radio-parts houses.

Circuit No. 1 was the earliest type of receiver and is comparable to a crystal set. The tube is connected as a diode and has

(Continued to page 260)



PICK YOUR JOB:	DO IT WITH SIMPLICITY:
Plowing, Rotary Tilling	6½", 8" and 10" Plows, Rotary Tiller Attachment
Preparing seed beds; cultivating	Disc Harrow; 6-Shovel Cultivator (Front and Rear Mounted); Cultivator Tools; Rotary Tiller Attachment
Lawn mowing	30" and 24" Lawn Mower; 59" Gang Mower
Weed Cutting; Clearing Fence Rows	30" Sickle Bar; 26" and 20" Rotary Weed Cutter
Clearing brush; sawing cordwood	20" Brush and Log Saw
Felling trees; Snow plowing; bulldozing; grading	42" and 30" Snow Plow and Bulldozer
Ride while you work	Riding Sulky
Hauling	Dump Cart
Belt Work; paint spraying; auxiliary power	Power Take-Off

Do more than 28 jobs in your **Simplicity** GARDEN WORKSHOP

Whatever the season, you'll find ways to save time and effort with Simplicity — America's Number 1 Garden Tractor. Now four great models offer practical, low-cost power for every garden workshop. The big 5 h.p. Model V has a new automotive type reverse. A Simplicity handles more than 28 different jobs with economical, easy-to-use attachments.

Ask your dealer to demonstrate Simplicity advantages on your own jobs! You'll agree that Simplicity is America's biggest garden tractor value!

SIMPLICITY MANUFACTURING COMPANY
5314 Spring Street Port Washington, Wis.

Write for FREE Catalog and Name of Your Nearest Dealer or See the Yellow Sections of Your Phone Book.

Four Work-Saving Simplicity Models for 1953!

2 HP Model L-1 — Ideal for most garden plots and large lawns. **\$170.00***

3 HP Model M-1 — Plenty of power for big jobs...pulls 8-inch plow. . . **\$248.00***

NEW 5 HP Model V — Utility tractor for farms and large estates, with selective gear transmission and reverse. Special 10-inch moldboard plow with rolling coulter and rotary tiller attachments. **\$298.00***

NEW 2 HP Model J — Built for the average yard. Self propelled. Special rotary attachments mow lawns, plow snow, cut weeds, cultivate gardens **\$99.50***

*Price F. O. B. Port Washington, Wis.; implements extra. Your Simplicity dealer will be happy to arrange convenient terms.

America's No. 1 Garden Tractor Lists for as Little as

\$99⁵⁰

Hints on How to Refinish Furniture

(Continued from page 248)

cars." These cars are a hideous example of how poor American styling is. They are no more sports cars than a motorized baby carriage. The power-to-weight ratio is not what it should be for a competition car and the steering and suspension are very poor.

The so-called horsepower race is another useless thing. It does not take as much power to move some of the heavy trucks as is put into standard-production cars. It is the power-weight ratio that determines pickup, but this should not be attempted with bigger and more powerful engines in heavy modern cars. Instead, manufacturers should try to decrease the weight of car and keep the horsepower the same.

Another fallacy is that of streamlining. The tops of most cars are fairly streamlined, so why not the bottom also?

Most American cars seem to have been designed without regard for safety. There are many reflections from the dash, also many projections. There is a ledge back of the back seat from which hard and lethal objects may slide during an emergency stop. We are glad to see that at least one auto builder *has* made efforts for increased safety.

Many of the less-expensive English autos use a heavier gauge of steel in the bodies than the high-priced American cars have. These poor materials, combined with bad workmanship and inattention to details, greatly decrease the value of our cars. Steering wheels could be made with four spokes at right angles to each other and with thicker rims. Perhaps someday auto manufacturers will come to their senses and try to catch up to the going jobs of the '30's. Even the old Model-T is better in most ways than the modern car—pound for pound, dollar for dollar.

Why cannot some manufacturer bring back the old Model-A or some similar car and forget about the rolling living rooms? There would be a very good market for such a means of transportation. The reason American buyers get these Detroit monsters is that there is nothing else available in this country and they have to keep up with the Joneses next door. Our advice is: Buy a small foreign car and treat yourself to a fine car.

Wortham D. Davenport,
John H. Willock,
The Hill School,
Pottstown, Pa.

To the Editor:

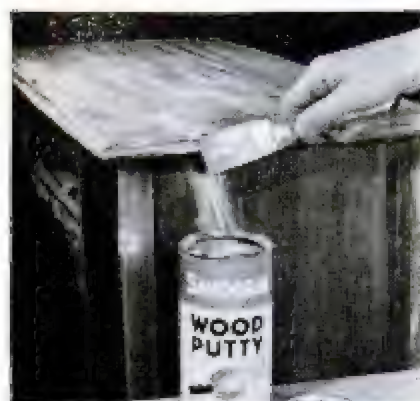
Generally speaking, I enjoyed the sections on cars until I arrived at "American

(Continued to page 294)

Step 1. Remove old finish—quickly, easily, with fast-acting Strypeeze. Brush on, let it set . . . off comes the old finish. (hint: sprinkle sawdust over Strypeeze. "Roll off" sawdust, Strypeeze and old finish.)



Step 2. Fill all holes, nicks—permanently and simply with Savogran Wood Putty. Tools easily, won't shrink. Now, sand entire surface with 6/0 sandpaper. (For cracks in plaster, use Savogran Crack Filler. It's the original patented quick-hardening water putty.)



Step 3. Refinish—before you start, be sure brush is clean. Savogran Kwikkeeze really cleans varnish brushes. Leaves no specks of old varnish, dirt in brush to mar finish. Apply stain, thinned shellac seal, then spar varnish or dull "rubbed effect" varnish in finishing.

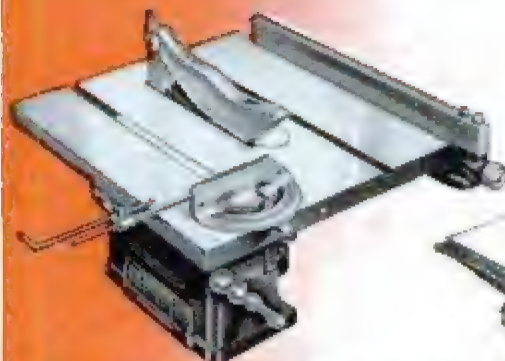


SAVOGRAN

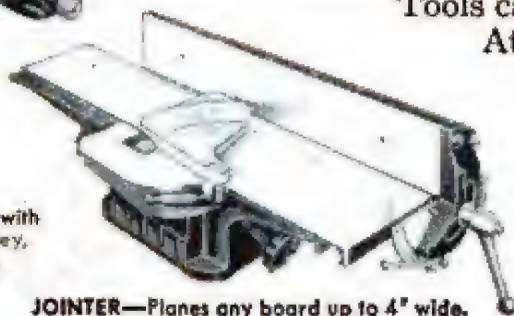
PRODUCTS . . . at better paint & hardware stores
Write for free helpful literature

SAVOGRAN CO., Dept. 31, 25 Huntington Ave., Boston 16, Mass.

You Can Own Any Of These Fine **DELTA** Tools **FOR LESS THAN \$50!***



CIRCULAR SAW—8" tilting table saw with rip fence, miter gage, guard, arbor pulley, splitter, anti-kickback fingers and blade. Big capacity, less motor, a great value at \$41.50



JOINTER—Planes any board up to 4" wide. Including fence, knives and safety guard—a fine finishing tool, less motor, for \$38.50



DRILL PRESS—Drill, mortise, rout, carve, shape and grind on this 11" drill press. With 1/2" Jacobs chuck spindle, belt and motor pulley, less motor, just.....\$48.95



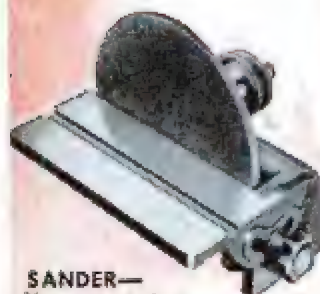
SCROLL SAW—A fine 16" tool to start the youngsters. Cuts intricate curves. Including arbor pulley, three blades and pulley guard, less motor, \$39.50



GRINDER—A real asset for your workshop or garage. Buffing, polishing and grinding wheels at small extra cost. Includes motor, guards and tool rests.....\$39.95



BAND SAW—10" size, for curve or straight line cutting. With wheel guard, blade and arbor pulley, less motor.....\$46.95



SANDER—You can use it to sand, drill, grind and burn. 8 1/2" disk diameter, less motor and miter gage. \$13.50

Did you realize it costs so little to own a DELTA home workshop?

Any of these famous Delta Homecraft Power Tools can be yours for less than \$50*.

At these prices there's no need to shop around—you can afford Delta quality.

These are standard Delta Homecraft tools with all the Delta quality features. Make this test: ask the professional woodworkers—they'll tell you that sooner or later you'll be satisfied with nothing but Delta. So, save money . . . start with Delta now!

Write for catalog: Delta Power Tool Division, Rockwell Manufacturing Company, Pittsburgh 8, Pa.

*Motors and accessories extra.



See these tools at your Delta Dealer (listed under tools in your phone book), leading department stores . . . and at your IRMA store.

See the new Deltashop at your dealer's, too—the four most used tools in a single one-motor combination that takes up only a 3-foot square. Buy it a tool at a time, or the whole unit with floor stand, less motor, for only \$209.95

DELTA QUALITY POWER TOOLS
Another Product of **Rockwell**



DELTA QUALITY MAKES THE DIFFERENCE

LUMITE*

WINDOW Screening

Won't Rust, Corrode or Stain



Costs **ONLY** 12¢-13¢ per sq. ft.

(Slightly higher west of the Rockies)

WRITE FOR FREE sample and descriptive folder
... or visit your hardware or
building supply store today.



LUMITE*

SARAN SCREENING

*Registered Trade-mark

LUMITE
DIVISION

Chicopee Mills, Inc., Dept. PM-31
47 Worth Street, N. Y. 13, N. Y.

UN's World Capitol

(Continued from page 104)

desk can tune into any hall and hear the speech in any translation he wants.

Suppose there's a back-and-forth debate going on instead of a speech. How will Sherry, sitting behind soundproof glass, follow from one speaker to another? Between every pair of seats at the conference table sits a mike. On his control console, the sound engineer has a pattern of finger switches laid out in the exact pattern of those mikes. Watching through the glass partition, he sees one man stop talking, another start. He switches off the mike nearest the first speaker, throws in the one nearest the second. Hence, an entire debate can be fed into the system with no danger of feedback from too many mikes.

Once in a while meetings are held outside UN headquarters where there are no electronic facilities. Rayburn Chestnutt's communications department solves this problem with tiny three-tube radio sets in plastic boxes. Each delegate hangs one around his neck, plugs in a pair of earphones, and he's all set. The sets will handle seven channels—one for each translation, plus the floor—and are good for half the loop diameter of the sending antenna, which is usually strung around the conference hall. A small, portable transmitter picks up and broadcasts the proceedings just as a full-size radio station would. It works like a charm, but the tiny radio sets are extremely popular. Four hundred have disappeared on their way to and from jobs.

Plenty of other things happen to Sherry's words as they pour from his lips. Down in a huge basement studio beneath the General Assembly they are piped into a recording room where one of 12 recorders preserves them on lacquer platters for permanent storage. Or they may go on magnetic tape via one of the 22 removable-cartridge machines for temporary preservation until they can be sent to the tremendous underground printing plant and set in type—or mimeographed along with some 1,500,000 other sheets that often pour from the mimeograph machines in a single day.

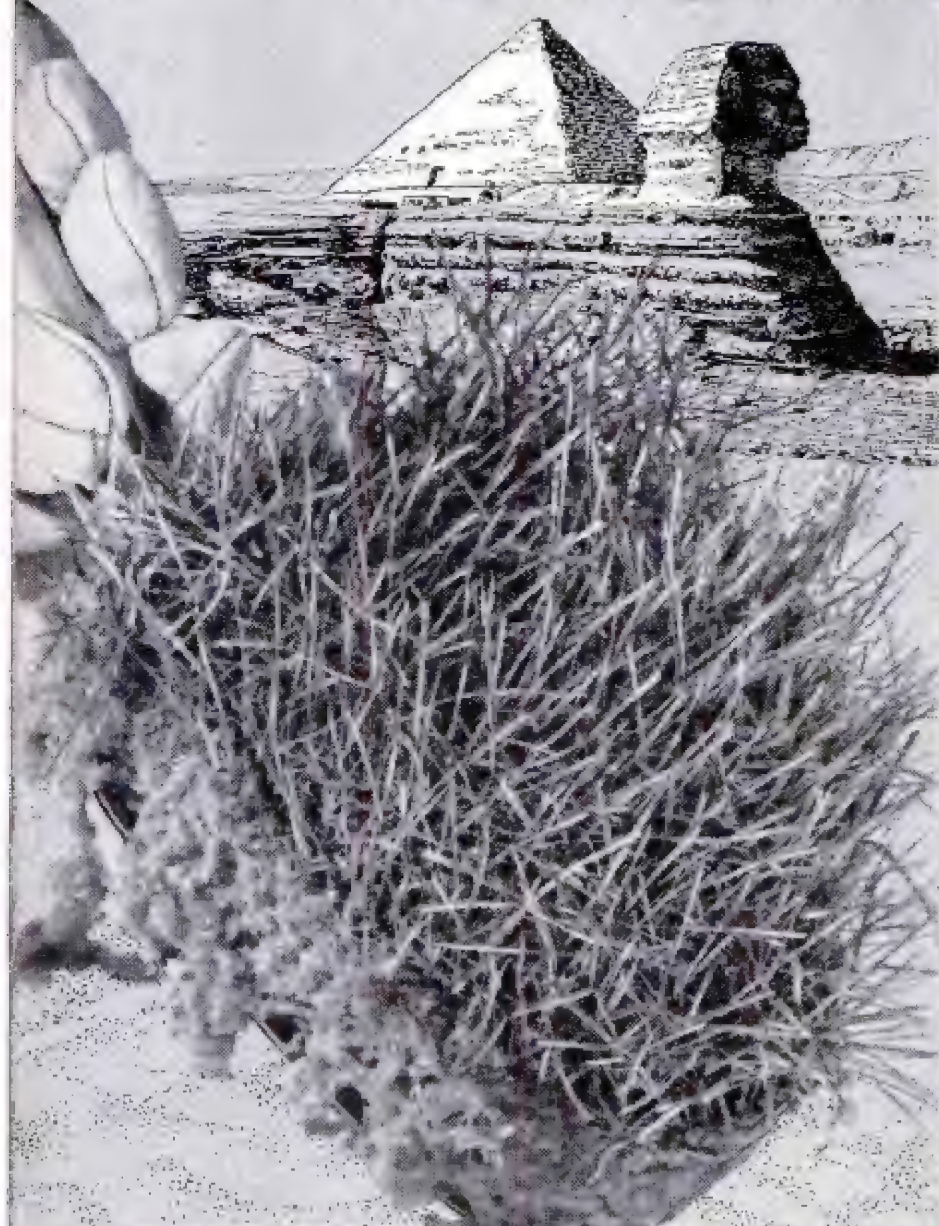
By the time George Sherry goes down to the subterranean garage and weaves his car up the labyrinth of ramps to surface viaducts, he's had a full day. So have most other UN employees. But the glittering edifices will not close down.

An army of cleaning and maintenance personnel moves in. The glass-walled buildings are ablaze with light. Sixty cleaning women and 130 porters keep things running. Fifteen miles of carpet in three-foot

(Continued to page 260)

Proof!

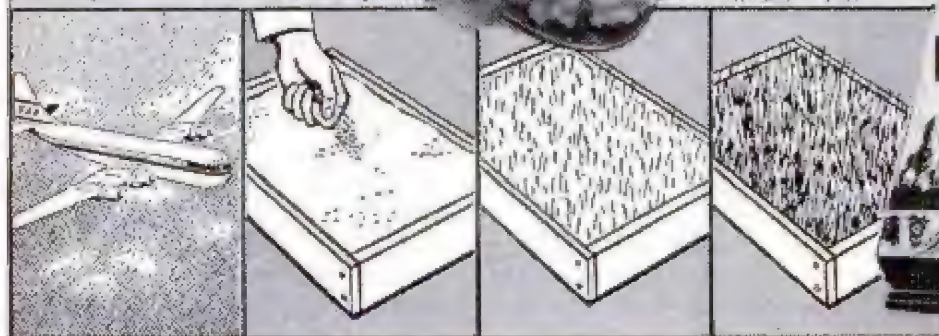
VIGORO* CAN GROW FINE LAWN GRASS *even in Sahara Desert sand!*



New feeding test reveals basic secret of gardening success

The thick, deep-rooted grass you see pictured here was actually grown in Sahara Desert sand—supplemented only by regular feedings of Vigoro. Here's conclusive proof that Vigoro provides every element grass needs to grow and thrive. With results like these in a sand test, you can imagine what Vigoro will do for grass grown in *real* lawn soil. No matter how poor or thin your soil may now be, Vigoro can make it rich in all the food elements lawn grass needs for fullest, finest growth. Apply 3 lbs. of Vigoro per 100 sq. ft.—see what a difference it makes on your lawn.

The VIGORO Family of Gardening Aids!



- Sand from the Sahara Desert, flown in by Pan American Airways for this test.
- We planted grass seed (new Merion variety) in this sand—and fed it Vigoro regularly.
- Vigoro goes to work! Soon tiny blades of grass appear... and push upwards.
- And the result! Thick, beautiful grass, as fine as might grow out of rich, black earth.



- **VIGORO**
- **instant VIGORO**
- **End-o-Pest**
- **End-o-Weed**
- **End-o-Weed Crab Grass Killer**
- **End-o-Pest ARC**
(Ant, Roach, Chigger killer)

**Vigoro is the trademark for Swift & Company's complete balanced plant food.*



"Buy the
tool
that does..." **5 kinds of
jobs well!"**

The SARGENT "GRIP-SNIP"*

1. **CUTS WIRE EASILY** . . . outside cutters cut wire even when it tightly hugs a flat surface.
2. **GRIPS LIKE A VISE** . . . a wrench-like grip that doesn't slip. Compound leverage multiplies power along entire length of jaws.
3. **HOLDS NUTS LIKE A WRENCH** . . . powerful parallel jaws and extra leverage prevent rounding corners.
4. **GETS INTO TIGHT SPOTS** . . . small nose of jaws permits working in close quarters.
5. **UNKINKS WIRE** . . . run wire between jaws, from either end, to straighten or pull it.

★ ★ ★

Don't be without your Sargent "Grip-Snip" another day. See 4½, 5½, 6½ and 8-inch lengths at your hardware dealer. Mechanics, sportsmen, farmers and handy-men call it their favorite. For further details, write Dept. 20D.

*Trade Mark



Sargent and Company
New York
New Haven, Conn.
Chicago

Builders Hardware and Fine Tools since 1864

strips must be vacuumed with the huge, castor five-horsepower cleaners. Telescoping platform-hoist towers—the biggest stretching upward for 75 feet—are broken out so cleaners can reach the highest points in the lobbies and dust the complex corners and cantilevered balconies. They will even reach the pinnacle of the General Assembly dome where burned-out lamps must be replaced. Four thousand wastebaskets must be emptied, 2000 Venetian blinds sponged, beautiful nickel-silver doors in the visitors' lobby must be steel-wooled with a special compound and thousands of square yards of bare floors scrubbed and resurfaced with nonskid preparation.

As for all those windows, a crew of 14 window cleaners started working when the buildings were completed. They haven't stopped yet, for as soon as they've made one round, clinging by safety belts to the glass-sided Secretariat or reaching from telescoping towers to squeegee down the vast crystal expanses of the General Assembly end walls, it's time to begin again.

And when the rising sun's reflection is bounced clear over Brooklyn by the huge mirror of glass on the east face of the Secretariat, the daytime UN army is on its way back to muss things up again for the night gang of cleaners.

But for all the frustrating cycles both in the conference rooms and in the area around them, almost any UN employee will agree with architect Harrison—that he and his staff of designers and engineers from dozens of countries have turned out one of the best workshops in the world. ★ ★ ★

Six-in-One Radio Lab. Project For Beginners

(Continued from page 254)

similar properties. The type 6SN7-GT tube is used in all six circuits. Now, having strained your ears to listen to a diode receiver, try circuit No. 2 which has increased volume, due to a stage of audio amplification. Circuit No. 3 dispenses with the diode detector and uses a grid-leak detector. In this circuit a third tube element (the plate) is used. In Fig. 4 another detector known as a power detector is employed. This type of detector is also used in Fig. 5. For all receiver circuits, use a good outdoor antenna and insulated headphones with inside terminals. A good ground is important; it can be made on a cold-water pipe or metal rod driven into the earth. Detailed student material list R-418 is available from Popular Mechanics Radio and Electronics department upon receipt of ordinary letter postage. ★ ★ ★

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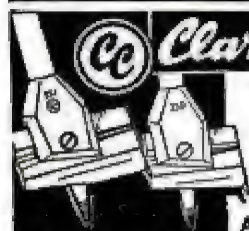
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Accurate, fast; cuts smooth holes in hard or soft wood. Chrome vanadium steel blades, all chrome body. No. 250, 1/2"-1 1/2", \$1.89; No. 251, 7/8"-3", \$2.19. **GUARANTEED.** At your dealer or write Dept. PM4

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#2 . . . Photographing Children BY WEEGEE

Every photographer is entitled to one pet peeve. Mine is baby pictures. They all look alike—stiff and mechanical like puppets on a string. Yet often hours and even days are wasted posing baby. And it's so unnecessary. When shooting baby pictures, I make a schedule of the child's routine.

Using the schedule, I know when I can take natural looking feeding pictures, realistic bath shots, and true-to-life outdoor photos. If you stick to the baby's regular schedule, every child is enough of a ham to give you all the cute photos you want. What's more, the schedule enables you to plan your shots, and get the effects you want without wasting film or time posing artificially.

There's more about photographing babies in my new booklet **WEEGEE'S SECRETS OF SHOOTING WITH PHOTOFLASH**. This 64 page booklet is not sold at any store. But you can get a copy by sending 25¢ and the wrapper from a carton of Westinghouse Photoflash Bulbs to Westinghouse.

Here is another point to keep in mind, whether you own a box, candid or press camera. In 20 years I've tried all brands of flash bulbs. And you just can't beat Westinghouse bulbs for dependability. I shot all of my new book — **NAKED HOLLYWOOD** with Westinghouse Flash Bulbs and never found a single dud. Try a carton of Westinghouse bulbs on my say so. You won't be sorry.

Next month I'll tell you how I shoot parties and weddings.



Weegee, the world's foremost flash photographer. Author of **NAKED CITY** and **NAKED HOLLYWOOD**.



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PARTIAL LIST OF CONTENTS

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- Putting Character into portraits
- Drama in news photographs
- Selling your pictures
- Photographer's place at a fire

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YOU CAN GET YOUR COPY ONLY WITH THIS COUPON.**

**WESTINGHOUSE LAMP DIVISION, DEPT. PM-4
Bloomfield, New Jersey.**

Rush my copy of **WEEGEE'S SECRETS OF SHOOTING WITH PHOTOFLASH**. I am enclosing the wrapper from a carton of Westinghouse flash bulbs, and 25¢ to cover postage and handling.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

The Owners Report on the Ford Six

(Continued from page 142)

acceleration to rest the right leg on long trips, he said.

A bookkeeper of Madison, N. J., wrote: "The dash controls should all work in the same direction. All of them pull out except the wiper and it turns, making it easy to pull that knob off."

A truck driver of The Dalles, Ore., wants better-built bodies, better-fitting doors, overhead valves and fuel-injection.

An assistant engineering professor at the University of Illinois suggested the following improvements: The accelerator pedal should be set at a more comfortable angle. The steering mechanism should be redesigned. It should be possible to start the engine with Fordomatic in "park" position. The defroster should be active over the entire length of the windshield and should deliver enough air to keep the rear window clear.

"More soundproofing in body construction would be desirable. The undercoat helps some but not enough," wrote a Salina, Kans., farmer.

"I find the dealer gives you a good deal but not much service on the new Ford," was the opinion of a Louisville, Ky., housewife. (The survey showed 30.5 percent of the Ford owners rated their dealer service excellent, 32 percent good, 25.5 average and 12 percent poor.)

Owners gave a high over-all rating to the

(Continued to page 264)

Engine is started by turning key with left hand, a feature Clymer feels is awkward for right handers



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How to improve your paint jobs...
make your brushes last longer



Start in corners of walls, ceilings and floors, and paint away from them. Use a strong stroke and work steadily so paint doesn't set before adjoining strip can be applied.

Don't let your brush "fish-tail" (see insert) by painting narrow or round surfaces with a large brush. Use small brush—one designed for the job—bristled with nylon.



Clean brushes with thinner after daily use. Suspend brush in thinner overnight. Bristle tips should not touch bottom of can. Work out thinner before painting again.



When you store brushes for longer periods, clean thoroughly and wrap securely in the manner shown here. Brushes stay in better condition when kept in shape.

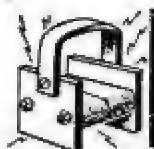
For best results use NYLON PAINT BRUSHES

JOB AFTER JOB, you'll get best results with a well-tipped nylon paint brush. Durable Du Pont nylon bristles paint smoother... are clean and sanitary... never get brittle... don't break off even under the roughest treatment. And nylon bristles last from 3 to 5 times longer than ordinary bristles. Leading manufacturers make nylon paint brushes in all types and sizes. Look for the name NYLON on the handle. Be sure to pick the size brush designed for the job... and demand Du Pont nylon bristles.



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No. M-725 (Weights 54 oz.) Has pull of 225 lbs. on steel block. \$15.00
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WHEEL
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Takes less than 3 hours

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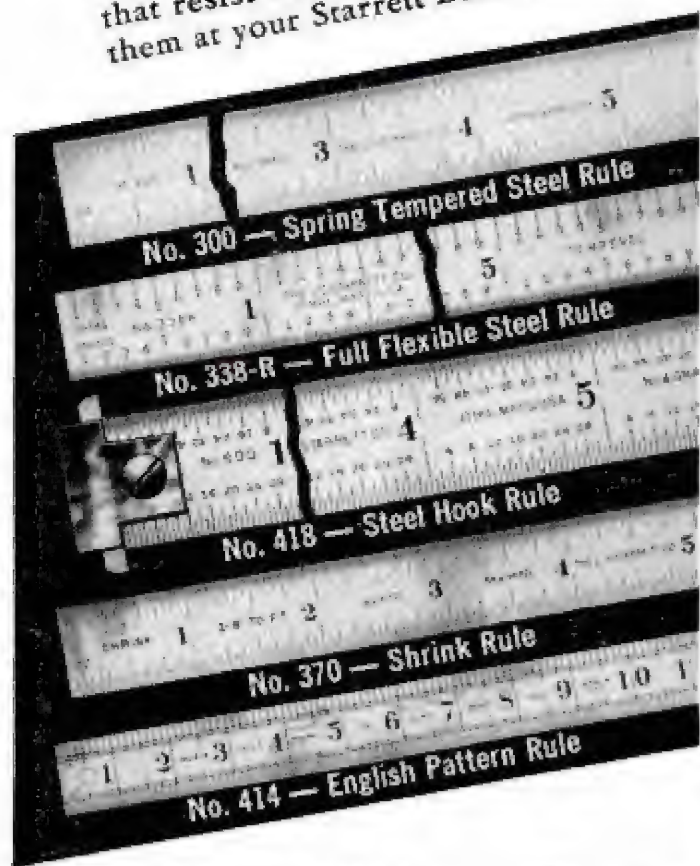
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HACKSAWS, BAND SAWS and BAND KNIVES

Ford, as follows: Excellent, 51 percent; good, 37.5 percent; average, 10 percent, and poor, 1.5 percent.

One interesting reply came from a San Diego, Calif., production scheduler in response to the question, "What were your main reasons for buying a Ford?" He wrote: "Because Ford already had the V8

1953 FORD SPECIFICATIONS

ENGINE

	V8	Six
Type	8-cyl., L-head	6-cyl., in-line, OHV
Bore and stroke	3.19 in. x 3.75 in.	3.56 in. x 3.60 in.
Piston displacement	239.4 cu. in.	215.3 cu. in.
Brake horsepower	110 at 3800 r.p.m.	101 at 3500 r.p.m.
Compression ratio	7.2:1	7.0:1
Transmission	3-speed conventional. Overdrive unit optional on all models. Fordomatic drive optional on all models.	

CAPACITIES

Oil	4 qt. (5 qt. with filter) all models
Water	22 qt. (23 qt. with heater) 15 qt. (16 qt. with heater)
Gasoline	17 gal. 17 gal.

GENERAL

Steering ratio (over-all)	26.3:1
Steering wheel, lock to lock	4 $\frac{1}{2}$ turns
Turning diameter	40 ft. (outside)
Brakes	Conventional hydraulic with riveted linings
Tire size	6.00x16 Mainline; 6.70x15 Customline
Recommended pressures	Mainline: 28 lb. front, 25 lb. rear; Customline 25 lb. front, 23 lb. rear
Shipping weight (4-door sedan)	3193 lb. 3115 lb.
Wheelbase	115 in.
Tread, front	50 in.
Tread, rear	56 in.
Height, over-all (4-door, unladen)	62.3 in.
Width, over-all (4-door)	73.2 in. Mainline; 73.9 in. Customline
Length, over-all (4-door)	197.8 in.
Road clearance	8.1 in.

INTERIOR DIMENSIONS

Front-seat width	58.9 in.
Rear-seat width	58.9 in.
Headroom, front	35.4 in.
Headroom, rear	34.2 in.
Legroom, front	42.8 in.
Legroom, rear	41.5 in.

and had just completed a change-over on the OHV 6, so they weren't likely to make another major change and leave me holding the bag."

And now for my own test of the 1953 Ford: In 1951 we covered the Ford V8 model, so we selected the overhead-valve Six for our 1953 test. I drove the 1953 Customline Six Fordor sedan with Fordomatic transmission 740 miles from Los Angeles to Fresno over the Ridge Route and returned over Pacheco Pass via the coast route. The mileage included off-highway tests on back roads and trails. Our deadline made it necessary to survey owners of 1952 models, while my test was on the 1953 model. There is no basic difference

(Continued to page 266)

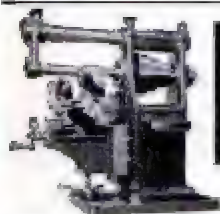
THE 1953 *Indian* BRAVE

Low in Price — High in Performance

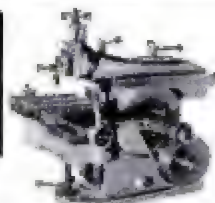


Ride the 1953 Indian Brave!
A Husky, Man-Sized Motorcycle in the
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Big Rugged 4 cycle Power Plant!
Pep, Performance, —and— Low Cost!

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Catalog with complete construction drawings of this No. 2 Bench Miller or six inch crank shaper 25 cents per set post-paid or send one dollar for drawings of shaper, three millers and three lathes. Refund on castings order.

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<p>Make Money Selling Eshelman Power Mowers Riding Tractors & Rotary Tillers</p>	<p>ESHELMAN FOR BETTER LAWN AND GARDENS</p>
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TRACTORS
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IN
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WRENCH

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Super Heavy Duty Coil

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Replaces any coil on any car
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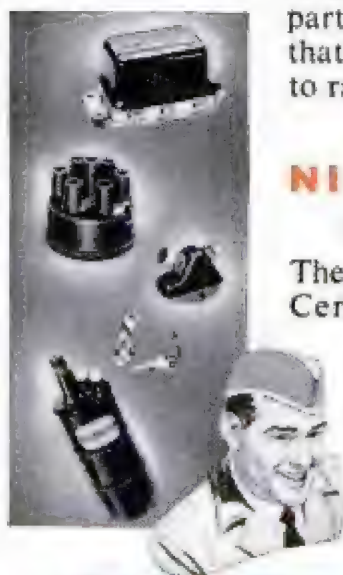
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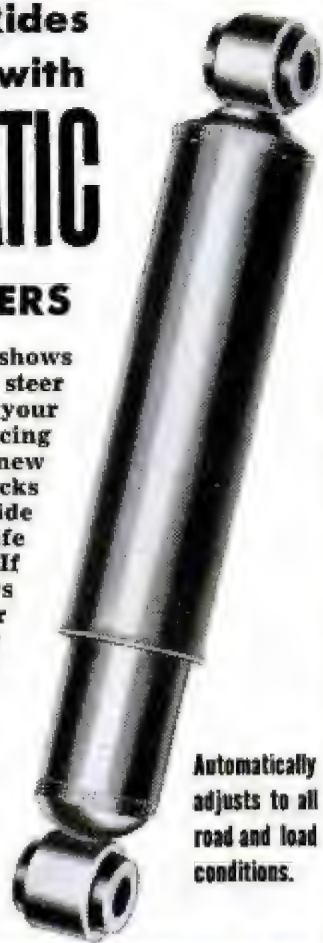


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If your car rides rough, shows uneven tire wear, is hard to steer on curves, chances are your shock absorbers need replacing . . . 2 out of 5 cars need new shocks. Monroe-Matic shocks give you a smoother, safer ride on any road—longer car life—increased tire mileage. If not convinced in 30 days Monroe-Matics make your car ride better than new, your money refunded. See your Monroe dealer today!

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Informative, instructive, tells the right shock for your car. Detailed instructions for removing old worn shocks, installing new. Send only a dime to cover handling cost.



Automatically
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between the two, but there are several '53 refinements.

Over winding roads and back trails I found the ride in the 1953 Ford superior to previous models and a pleasure to handle at any speed. By increased front-wheel vertical travel and redesigned rubber-compression bumpers, front-end road shock is tremendously reduced. Springs are now tailored to the weight of each model for best riding comfort. There is very little road bounce.

The 101-horsepower overhead-valve six-cylinder engine of 215.3-cubic-inch displacement which Ford introduced in 1952 is a modern, well-engineered unit, with 7.01:1 compression ratio and 24 cubic inches less displacement than the 110-horsepower V8 engine.

The engine is economical. The Six will out-accelerate the V8 model up to about 60 miles per hour and has almost as high top speed. It really will get down and lug better at slow speed than the V8. The engine has great low-speed pulling power. Although it virtually is a "square" engine—and it is the long-time conception that only a long-stroke engine will get down and lug—on my 32-percent test hill I found the Six has good torque and with wide-open throttle would "hang on" tenaciously at 10 miles per hour in low range.

The engine is smooth and has little vibration; in fact, above 20 miles per hour you can hardly tell that the smooth flow of power is coming from a 6 instead of a V8. Top speed by speedometer (which is fast by about 6 percent) is 90 to 92 miles per hour.

Regular gas was satisfactory and I found the Six to be an economical car (see Economy Chart).

Ford owners have a choice of the in-line Six or the 239.4-cubic-inch V8 with 7.2:1 compression ratio. Of the owners reporting, 57 percent had V8s. The Six is gaining in popularity: 43 percent in the survey now own sixes as compared to 18 percent in our previous Ford survey.

The body is solid. The workmanship and assembly for 1953 seem to be better than at any time since the war. Driving in extremely heavy rainstorms, I found no leaks. No rattles or squeaks developed.

Steering is easy and $4\frac{3}{4}$ turns of the large wheel will satisfy almost everyone but the sports-car enthusiasts who like quick-acting steering.

I rate Ford's interior finish "tops" for the lower-price class. The upholstery and the springs in the foam-rubber cushions give an extremely comfortable ride. The enlarged curved one-piece windshield and the wide rear window offer excellent vision.

(Continued to page 268)

**SAVE ON
BRAND NEW**

HEAVY DUTY HYDRAULIC and AIR EQUIPMENT



LOGAN AIR CYLINDER
Item #350 — Double acting pneumatic cylinder, 6" bore, 6" stroke, 1 1/2" shaft. Adjustable cushions at both ends. Flange mounting at shaft end. Overall length closed 18". Ideal for use in 125 PSI systems. Shipping weight 40 lbs. F.O.B. Chicago. **39.50**



LOGAN 4-Way, Foot Operated AIR VALVE, Item #59. Model #520—Ideal for operating air vices, presses, air machinery, and other double acting pneumatic devices. Heavy cast construction. Standard 1 1/2" pipe thread ports. Overall dimensions 8 1/2" x 5 1/2" x 7 1/2". Gov't acquisition cost \$42.00. Shipping weight 28 lbs. An outstanding buy. F.O.B. Chicago. **15.00**

Large supply of new labor-saving, economical hydraulic equipment in many types and sizes. Use these positive, highly efficient smooth pressure hydraulics on presses, ar-bors, lifts, loaders, power control, positioning, brakes, plastic dies, auto frame alignment, etc.

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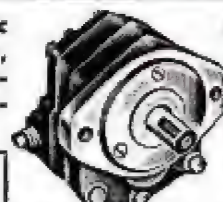
ITEM #1036

ITEM #42—Double action hydraulic cylinder, 4" bore, 1 1/2" stroke. Rated lift capacity with 1000 PSI line pressure is 12,500 lbs. Ship. wt. 30 lbs. F.O.B. Chicago. An Excellent Buy for. **32.50**

ITEM #16C—Double acting hydraulic cylinder, 1 1/2" bore, 26" stroke. Will lift 1760 lbs. with 1000 PSI line pressure. Weight 8 lbs. A \$55.00 value. Now only. **16.95**

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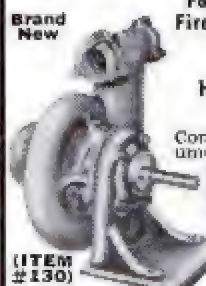
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MULTI PURPOSE
Hydraulic Pump
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Silent, High Efficiency, Helical Gear Type Ball Bearing, Hydraulic Pump or Motor. Rated 8 Gal. Per Min. At 1500 R.P.M.—Delivers—1000 P.S.I. Using 6 H.P.—Reversible Rotation—3/4" Pipe Thread Inlet and Outlet Ports—1 1/2" Drain Port—3/4" shaft with keyway and flat for either direct or pulley drive. Dimensions—5 3/4" high, 7 1/4" long, 5 1/2" wide. Shipping weight 18 lbs. F.O.B. Chicago. **45.50**

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Suction Lift	Head Pressure	Gal. Per Min.	H.P.	R.P.M.
10"	75"	260	6.0	3500
10"	65"	200	5.2	3500
10"	80"	40	1.5	2500
10"	50"	140	5.0	3500
10"	30"	100	3.0	2500



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USE FOR: • Reamer Drives • Midget Cars • Feed Mills • Ginning Machines • Conveyors • Lathes • Milling Machines • Motor Boats • Cream Separators • Garden Tractors • Pumps
Variable output from 0 to input speed available by moving control handle. Locking handle maintains setting. Use input power of 1/4 to 1 1/2 H.P. This Westinghouse-Oil Gear Unit consists of a variable displacement hydraulic pump feeding a fixed displacement hydraulic motor. Adjustable relief valves set at factory for 100 inch pounds of torque may be reset up to 180 inch pounds. Independent reverse control allows full output power and speed selection in either direction of rotation. Shafts measure 3/4" diam., include keyway. Input rotation is counter-clockwise facing shaft. Recommended input speed not to exceed 750 R.P.M. Overall dimensions, 7 1/2" x 7 1/2" x 11 1/2". Gov't acquisition cost, \$428.00. Ship. wt. 31 lbs. Complete with 2 qts. of oil and full instructions. F.O.B. Chicago. **54.50**

ARC WELDER

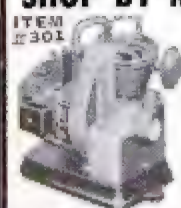
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DUAL RANGE**

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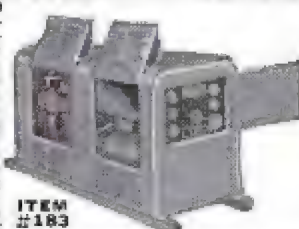


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Item #300—Model C18—3 KW—110 Volts, D.C. This mighty unit develops 3 KW—28.5 amps. D.C. Standard Delco generator direct coupled to a Model Z2P Briggs and Stratton 1 cylinder, 5-7 HP, air cooled, rope starting gas engine. Instruments include voltage control rheostat & voltmeter. Ideal for Power Tools. Wt. 275 lbs. F.O.B. Chicago. **295.00**



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Item #182, Onan Power Unit PE-95C is an electric generating set consisting of a 4-cylinder, 4-cycle, 1-head, liquid-cooled, electric starting gasoline engine, directly connected to an AC generator of the revolving field type. Uses approx. 1.1 gal. of gas per hr. at rated load—generator is rated at 5 KW, 60 cycles, single phase, 115V, 52 AMPS. F.O.B. Chicago. **795.00**

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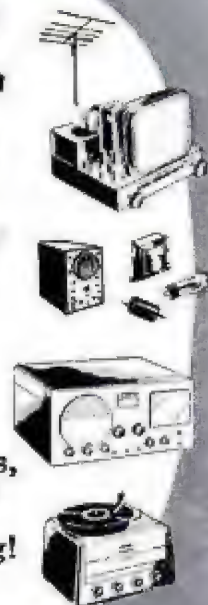


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Doors open and close easily. New is the arrangement whereby the door is held stationary at the half-open position, which is convenient in parking lots or other close quarters. Window cranks operate easily; however, they require $3\frac{1}{2}$ turns for opening or closing, which is too much. I don't know why some engineers think drivers like the exercise of turning window cranks so many turns.

In my previous article on Ford, I criticized the fact that the full-circle horn ring obstructed the view of the speedometer and other instruments. I'm glad to see that the unnecessary upper half of the horn ring has been eliminated.

All switches are within easy reach and well located, except that the switch-key starter is operated by the left hand, which I don't like; most owners are right-handed. I'll bet the majority would prefer a switch key operated by the right hand. Ford sticks to the manual choke, which I still prefer despite the fact that automatic chokes are gaining in popularity.

There is a lot of legroom in the car. The wide brake pedal is excellent and is mounted from above so that tremendous leverage and easy operation result. This design eliminates the hole in the floorboard so that no dust or air enters. (93 percent of the owners like the overhead-mounted brake pedal.) Even at high speeds and over winding roads I found little fading of the excellent brakes. They are self-energizing, which means that the vehicle's forward motion helps in their application.

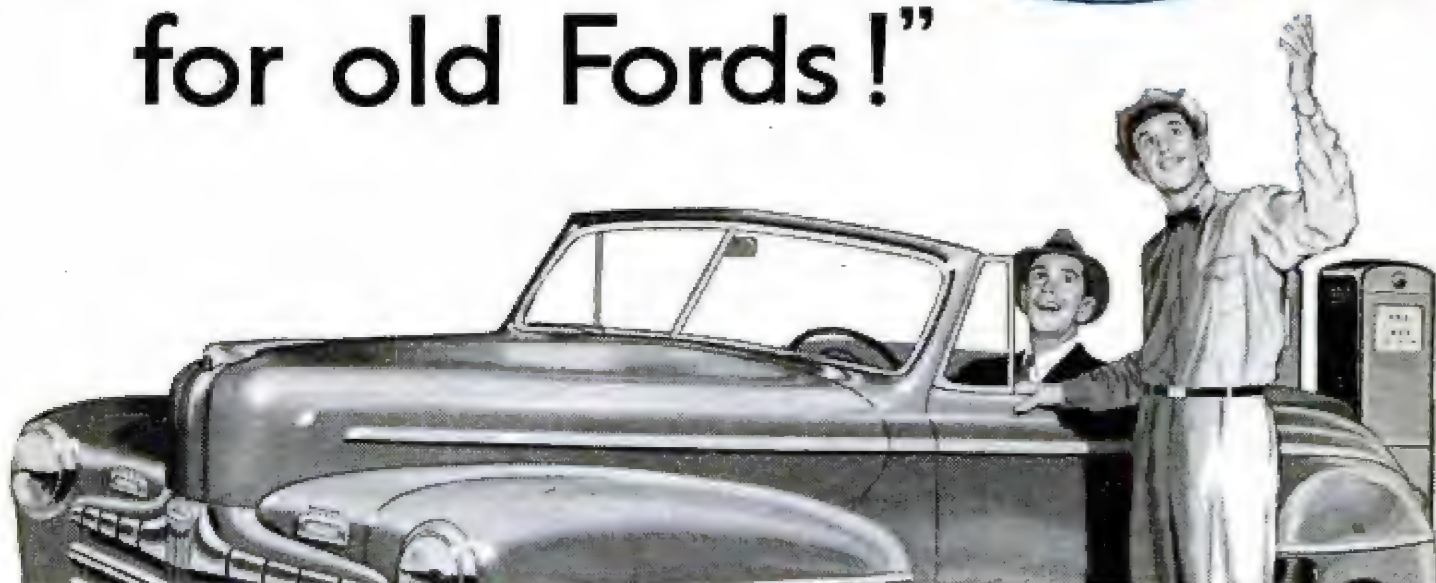
Ford's headroom is better than average and a tall person wearing a hat can ride in comfort.

The hood locks only on the outside. I would prefer an inside lock, which helps prevent theft of underhood units. The six-cylinder-engine oil-filler cap is conveniently mounted on top of the valve cover, which service-station men will appreciate. The oil filter is mounted horizontally on a bracket which is part of the crankcase casting—a practical idea. The center-fill gasoline-cap location which Ford introduced last year is highly desirable and makes it easier for the attendant to fill from either side. (More makes are adopting center-filling.)

Purchasers of 1953 Fords have the option of three transmissions. They are three-speed conventional, three-speed conventional with overdrive, and fully automatic transmission (Fordomatic). In spite of the popularity of automatic transmissions, it appears that owners in the lower-price brackets are not as "self shift" conscious as purchasers of higher-priced cars. Our

(Continued to page 270)

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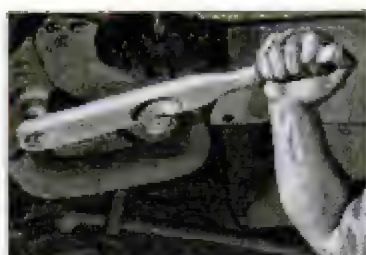


"TOE IN" AGAINST CURB

curb or put car in gear. If you don't, there's always a chance the parking brake may "relax"—and you may be faced with a costly repair job you could easily have avoided.

Don't let your car "hang" on parking brake alone. When parking on even a slight grade, always "toe in" front wheels against

Check body and chassis bolts—when you "tune up" this spring. Loose bolts allow car to develop squeaks and rattles . . . may cause wear by developing uneven strains. Torque wrench should be used in accordance with body-bolt torque specifications of car manufacturer.



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report shows that 48 percent of the owners polled still stick to the conventional three-speed transmission, while 23 percent prefer the overdrive unit (a drop from 39 percent last year). However, Fordomatic owners we polled showed an increase from 16 percent to 29 percent; 38 percent of the V8 owners have Fordomatic while only 20 percent of the six-cylinder owners have it.

I found Fordomatic to be a very satisfactory unit and it certainly rates high among those who know automatic transmissions. It is flexible in operation and there appears to be little slippage or effort in getting under way. There is a slight hum while accelerating, which diminishes as speed increases. Fordomatic combines a three-speed torque-converter transmission with a 3.31:1 rear-axle ratio (as against 3.90:1 ratio with regular transmission). The gearbox is the planetary type, permitting shifting between all ratios without torque interruption. Gear ratios are 2.44 in low, 1.00 in high and 2.00 in reverse. Before the engine can be started the shift lever must be in neutral.

Starting in drive range with moderate throttle, all gear changing takes place smoothly and almost effortlessly between 17 and 65 miles per hour, depending on throttle opening. It shifts to high gear at about 65 miles per hour with a slight forward surge, but only when the throttle is held wide open. In ordinary driving, it shifts to high between 25 and 30 miles per hour when the throttle is held in slightly open position or foot pressure is taken off the throttle. Acceleration is good, using drive only, but can be increased somewhat by starting in low, allowing the engine to "rev" up to about 30 miles per hour, then pushing the selector lever quickly to drive while the throttle is wide open.

Even with full or light throttle, Fordomatic shifts down to intermediate gear below 20 miles per hour when in drive position. Down-shifting is smooth and at speeds below 40, regardless of throttle opening, the shift to low places the transmission in its lowest ratio (2.44:1). This aids braking on descending grades or for fast stops. Below 57 miles per hour, intermediate ratio is brought into use by pressing the throttle quickly to the floorboard; at speeds below 20 miles per hour, downshift to intermediate occurs at less than full throttle. Under closed-throttle conditions, the automatic downshift occurs between 5 and 8 miles per hour.

Like most automatics, there is a tendency to creep if the engine is running while standing in drive or low with the throttle

(Continued to page 272)

Here's a New Portable Jig Saw with a Real Motor made by Black & Decker

And it converts quickly to a handy, stationary (table model) Jig Saw

Only \$49.50 complete with 5 different blades.
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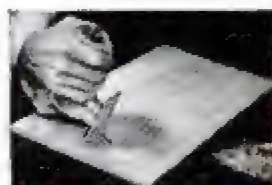
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closed. “P” position on the quadrant is for parking; it locks the transmission with or without the engine running. The car will not roll in either direction. I tested this on a 32 percent grade and the car did not move an inch when in “P” position, without hand or foot brake being used.

After putting the new Ford Six through its paces, I conclude that Ford for 1953 offers a reliable, dependable and economical car. While Ford apparently has not entered the horsepower race in the lower-price field (as horsepower for both Ford engines is the same for 1953 as it was in 1952) the only objection I find is that more horsepower in each engine would be desirable. The Ford V8 made its reputation by having outstanding acceleration and top speed when it was introduced in 1932, and for a period of years it maintained its reputation as a top performer. Actually, the Ford V8 today develops only slightly better top performance and power than some earlier and lighter models, because today's Ford is several hundred pounds heavier than the first Ford V8s—yet it is powered with an engine developing 110 horsepower as against 85 horsepower in prewar models. Speaking as one who wants exceptional performance (and millions do) I'd like to see Ford drop in about 25 more horses in each engine and regain that reputation for zip and pep for which the earlier V8 models were noted. To do so probably would require more displacement in the Six, but an overhead-valve arrangement would be all that is needed for the V8 in which displacement is sufficient. Perhaps we shall see that before too long. ★ ★ ★

Sub-Zero Commercial Cooler

Food cooled to a frigid —150 degrees Fahrenheit by a “cascade” process was recently shipped by unrefrigerated boxcar from San Francisco to Chicago, where its temperature registered a safe —10 degrees. This same freezing process is being used to strengthen hacksaw blades by changing the crystalline structure, to “age” gauge metal and to shrink steel valve rings so they may be inserted easily in automobile engine blocks. Capable of cooling materials to —280 degrees, the system uses a special refrigerant which is denser than ordinary gas and is itself refrigerated as it moves through two 2-stage compression cycles. An automatic cabinet freezer no bigger than the average home freezer is now being manufactured for laboratory use. This system of refrigeration uses less horsepower than the conventional method. A two-horsepower engine will do the work of the 7½ formerly needed.

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HARLEY-DAVIDSON

HYDRA-GLIDE®

This Curiosity Shop Beats the Dickens

(Continued from page 127)

canoes through a back window of the shop.

"I have seen as many as a hundred baskets lined up on the dock," recalls James. "Standley would walk down the dock with a bag of money and place in front of each basket the amount of money he was willing to pay for it."

"Indian and Eskimo handicraft is a fading art," says James. "We used to have a trader roaming through Alaska who picked up tons of the stuff every year. Now we get it piecemeal. Tourists have cleaned out the curios in Alaska like grasshoppers clean out a wheat field."

Today the Indian who comes into the shop with some handicraft usually has it wrapped—and well disguised—in paper. James once asked an old one why, and got this answer: "White man too nosey. Many times me stopped on street by people who want look. This makes walk slow. Me wrap up. Walk fast."

Eskimo and Indian handicraft has long been fascinating to Europeans. "One day—before World War I—there were buyers in the shop at the same time from Berlin, Paris, London and Moscow," recalls James. "They all knew one another, too."

The shop is famed as a world's crossroads.

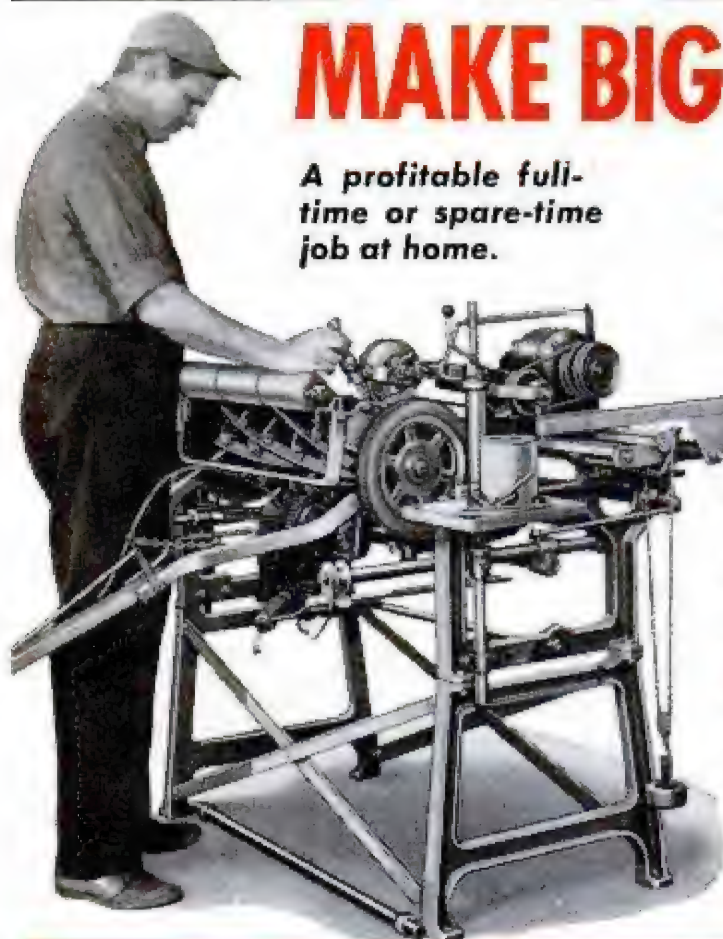
Some 3000 persons, from many lands, pass through it in a day. The stream is endless and a couple dozen persons must invariably be nudged to the door at closing time.

Recently two bearded men who entered the shop separately met over some walrus tusks. They looked at each other as if they were gazing into a mirror. The resemblance was striking. Questions were asked, shoulders clasped, tears shed. The bearded men were brothers from the Balkans who had not met in 40 years.

Marliss Poth, salesgirl, is fascinated with her work, not because of the thousands of interesting curios in the shop, but because of the thousands of intriguing persons who come to buy them.

"My first customer one morning was a woman from Italy," she recalls. "Wanted to buy some Eskimo muk-muk spoons for a museum, and examined each one carefully through a monocle. Next came a woman from India wearing her native garb, with a caste mark on her forehead. She spoke excellent English, but never a word to me directly in buying a shell lamp. All conversation passed through a man who seemed to be an aide or secretary. Maybe my freckles indicated I was of an inferior caste. My next customer was a large American woman wearing plaid shorts and wanting to buy

(Continued to page 292)



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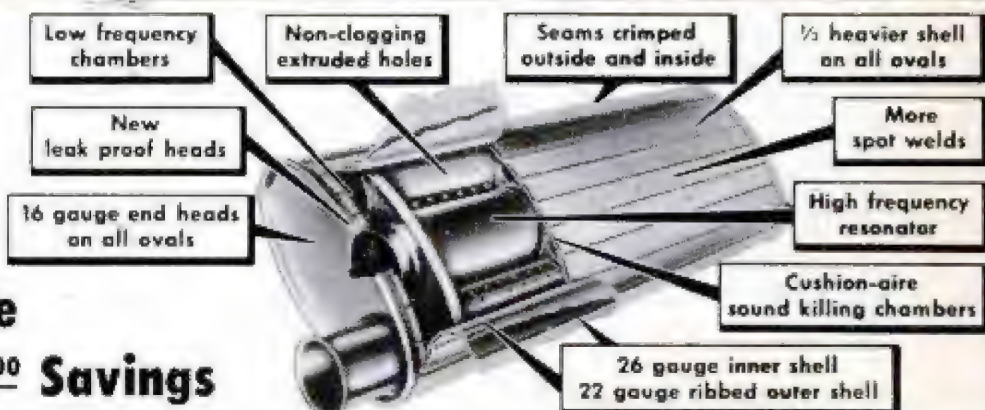
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Diam.	Arbor Hole	Fits These Saws	Price*
5 $\frac{1}{8}$ in.	13/16 in. diamond	6-in. Skill-saw electric hand saw	\$ 8.95
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4-pc. Set. Sizes listed below... \$3.98*
 $\frac{1}{4}$ -in. size: 4-in. length..... .85*
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 $\frac{3}{8}$ -in. size: 4-in. length..... 1.15*
 $\frac{1}{2}$ -in. size: 4-in. length..... 1.35*



CRAFTSMAN Carbide-Tipped Scraper. Works faster and stays sharp longer than ordinary steel scrapers. For scraping paint, enamel, or varnish from wood, metal, or masonry. Blade is 2 inches wide; has two scraping edges. Comes in two sizes. Get one in time for your spring house scraping. Available at your nearest Sears Retail Store.

7 inches long..... \$2.75*
 11 $\frac{1}{2}$ inches long.. 2.95*



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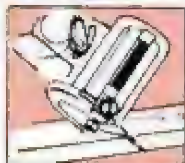
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\$299.00*
Cash

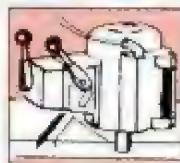
Without legs or lower shelf

\$30.00 Down

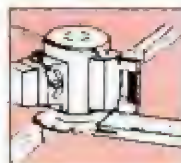
On Easy Terms



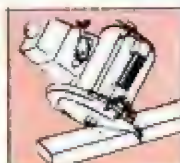
Bevel Cuts!



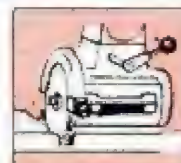
Routs!



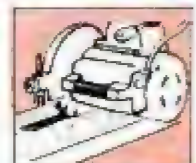
Tenons!



Cuts Rafters!



Dadoes!



Ploughs!

Only \$30.00 Down puts this great Saw in your shop!

We believe there is NO other radial saw of this quality in this price range! Crosscuts, rips, miters, compound miters, rabbets, and even shapes with proper cutters! Precision-built for continuous, heavy duty use . . . for production millwork, lumber yards, shipping rooms, contractors, builders, etc.

Saw pulls through work; swings, tilts, locks in any position; quick-setting stops for 0, 45 and 90°. Controls in front. Automatic front-pivoted guard encloses blade edge. Sealed, lubricated-for-life, precision ball bearings. Capacity of cut, 2 1/8 in.; crosscut capacity, 12 1/8 x 2 1/8-in. stock; rips to center of 48-in. sheet of plywood. Anti-kickback pawls.

With 10-in. carbide-tipped 8-tooth combination blade (1-in. bore); 1-H.P. 3450 R.P.M. single-phase ball-bearing capacitor motor (115-230 volt 60-cycle A.C.); 15x42-in. wood work table with removable fence; and 28x36-in. stamped steel base. (Steel legs and lower shelf not included.) Make your own comparison . . . convince yourself! Prices shown are for shipment from factory in Cincinnati, Ohio.

CRAFTSMAN Radial Saw, as above . . . Cash \$299.00*

Set of 4 steel legs and lower shelf for CRAFTSMAN Radial Saw above . . . Set \$23.00*

*Prices slightly higher south of the Ohio and west of the Mississippi rivers.

Famous for fine quality . . . precision performance . . . low price!

NEW! Worcester

ROTOR MASTER* MODEL 810

Cuts wider than its own tread! • Extra rugged, reinforced housing • Deflector whisks debris off to the side • Safety-slip clutch and belt drive save blade and motor from shock and strain • Tough "Sta-Temp" air-screw blade stays sharp longer • Briggs & Stratton 1.6 h.p., 4-cycle engine.



A GREAT NEW "Rotary"

with the most famous name in mowers!

Here's the "master" of all rotary mowers — the new Worcester ROTOR MASTER, developed by Worcester Lawn Mower Company, makers of quality lawn mowers for more than half a century.

With its high speed, air-screw blade forming a powerful suction, it does a perfect job of drawing up tough, high, matted grass or weeds and cutting them at just the height you want. Then it spreads the cuttings in a fast-decaying mulch that's beneficial to your lawn. And, because the Worcester ROTOR MASTER cuts a 20-inch swath that is *wider than its own tread*, you can trim right up to walls, walks, shrubs, etc. Extra large rear wheels and *balance poised* engine mounting make it "handle like a baby carriage".

EXTRA RUGGED CONSTRUCTION

As for safety — rugged steel housing is heavily reinforced for extra strength. Deep front guards protect the sharp, "Sta-Temp" blade from sticks and stones. A special deflector sends clippings and debris off to the side. High quality safety-slip clutch and v-belt drive save the blade and motor from shock and strain.

See this beautiful, rugged new Worcester power mower at your dealer's — now!

Valuable hints on lawn care!

Details on the complete Worcester line of mowers, which includes: 20" Worcester ROTOR MASTER* Model 810, rotary mower; 21" Worcester SHEAR MASTER* Model 900, reel-type; 18" Worcester POWER MASTER* Model 750, reel-type; 18" Worcester DYNA MASTER Model 700, reel-type electric mower; and four modern hand mowers. WRITE FOR BOOKLET, full of interesting illustrations.

*Reg. U.S. Pat. Off.

WORCESTER LAWN MOWER COMPANY

Division of Savage Arms Corporation
84 Broadway, Chicopee Falls, Mass.

They Outsmart Death in the Air

(Continued from page 85)

The pilot was near exhaustion. Running at top speed with the heavy exposure suit was sapping his strength. Though it kept him warm it was added weight. He had to rest. In desperation he threw himself down behind an embankment and aimed his jammed pistol at the soldiers. This ruse worked for they stopped and took cover. Their indecision gave him a breather.

He could see the planes above and wondered why they didn't come in and strafe his antagonist.

The senior pilot in the ResCap group had given up hope of finding the pilot and radioed the controlling force his intentions to return to base. The helicopter did not receive this transmission, however, and continued on a rescue course. The senior pilot broke away from his formation and went after the helicopter to signal, by light, to end the search.

On the ground the downed pilot raised his head above the embankment, like a turkey gobbler on a frosty morning, and the soldier creased his throat with a bullet. The pilot fell back and clutched the bleeding flesh muttering, "Oh God, I've really had it now!" He cleared his throat and spit but no sign of blood was evident. He thrilled at this, for it meant that he had only a flesh wound.

However, the accuracy of the near-fatal shot spurred him on to renewed efforts. For the first time he lit one of his flares, leaped out of his hole and was off running again with the Commies in hot pursuit. He knew now the game was for keeps; it was escape or be killed. His pursuers must have felt inspired, knowing they had finally wounded him, for they no longer picked their way around the puddles but dashed madly through them in hot pursuit.

The flare was only lit seconds when the pilot heard the chatter of machine-gun fire. He looked up to see the ResCap planes diving and strafing the area around him. He waved that flare vigorously and for the first time in his headlong flight thoughts of home, his ship and the buddies flying those planes flicked across his mind.

Whether the soldiers were killed or not he did not know or care. At least, their firing had stopped.

His rescue was fast. The helicopter picked him up and delivered him to a destroyer which in turn transferred him via a highline to his carrier.

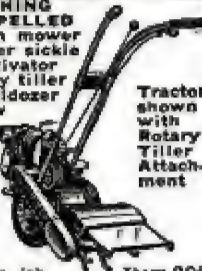
This was the end of his nightmare. It was also the beginning of work for the Navy's safety machinery which starts its

(Continued to page 280)

MASTER GARDENER

NO PUSHING
SELF-PROPELLED
It's a lawn mower
It's a power sickle
It's a cultivator
It's a rotary tiller
It's a bulldozer
It's a plow

Where else
can you get
a power
tool that
does so
many jobs.
Works for
you year
round.



Tractor
shown
with
Rotary
Tiller
Attach-
ment

Does terrific job
of preparing mellowed deep seed
bed without labor. Built-in power
take-off to drive pumps, saws,
generators, etc. Safety clutch—can't
burn out. More versatile and effi-
cient than tractors costing twice as
much. Converts in minutes to Lawn
Mower, Power Sickle, etc. Basic
self-propelled 2 hp tractor with
Briggs or Clinton famous engine. Only **\$119.50**
Snow Blower.....**\$39.50**
Rotary Tiller.....**\$42.50**
Sickle Bar-Mower.....**\$42.50**
Farrowing Tool.....**\$ 8.75**
Lawn Mower Hitch.....**\$ 4.50**
Cultivator.....**\$ 8.75**
Disc Harrow.....**\$15.75**
Shipment prepaid in most areas.
Easy payment plan available.

32 Pc. SOCKET SET



Highest quality guar. non-break-
able sockets made by Husky.
Beautiful, matched chrome al-
loy, absolutely the best. Com-
plete range of 21 sockets from
1/4" thru 7/16" in 1/4" drive and
7/16" thru 1-1/16" in 1/2"
drive; 2 extensions, reversible
1/2" ratchet, adaptor bit, slide
head, all angle coupling, 2 end
wrenches, 1/2" spreader handle
and sturdy metal tool box. For
prof. mechanics who want the
best. Wt. 14 lbs. (Item 59)
Easily worth **\$16.95**

45 Pc. SOCKET SET
(Item 205) Contains a complete
set of sockets in 1/2" drive, 3/4"
drive and 1/4" drive, plus all
necessary extensions, handles,
spreaders, reversible ratchets,
etc.; all uncond. guaranteed
against breakage. Beautiful
matched chrome thin wall al-
loy sockets in a sturdy hand-
some steel tool box. Wt. 17 lbs.
List price \$62.90. **\$26.95**
Factory Special.

6-Pc. MAGNETIZED Screw Driver Set
Permanently magnetized
tempered and hard-
ened steel blades. Plas-
tic handles—unbreak-
able and shock-
proof. Picks up
and holds screw in
tight spots. Makes
impossible jobs easy.
You get following types:
Midget, stubby, close quar-
ter, cabinet, thin blade, ma-
chine, heavy duty, extra heavy
duty. Fully guaranteed. Easily
worth \$4.95. Item 106: **\$1.95**
wt. 3 lbs. Special.

3-Pc. ADJUSTABLE WRENCH SET
Made of finest steel
alloy, chrome plated.
Prices are exactly
half actual value.
Takes the place of
a whole set of tools.
Packed in leather-
ette pouch.
Set A—3-inch, 6-
inch, and 8-inch
wrenches. (Item
107), wt. 2 lbs.,
only **\$2.95**
Set B—6-inch, 10-inch,
and 12-inch wrenches. (Item
108), wt. 4 lbs., only **\$6.45**

3-Pc. PIPE WRENCH SET
Made of finest German Tool
Steel. Completely
drop forged. Pipe
size clearly
marked for easy
one-hand setting.
Heavy sharp jaws
will never slip.
Ideal for master
craftsmen. Set in-
cludes 8"-10" and
14" wrenches. Covers
most pipe sizes. A com-
bination of brute strength
and precision workmanship.
Will pay for themselves on one job.
Item 12. Wt. 6 lbs. Easily
worth \$11.95. While they last. **\$6.55**

BEDROCK FACTORY PRICES

Discounts 50 to 85%

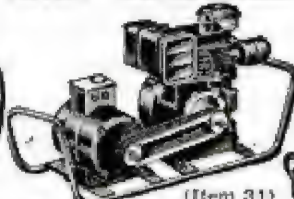
WORLD'S FINEST GUARANTEED LIGHT PLANTS



(Item 24)

PORTABLE LIGHT PLANTS
PUSH BUTTON START
A.C. PLANT 600-700 watts
—115 v., 60 cyc. A.C. Pow-
ered by a rugged 2 hp.
easy-starting Briggs gas
engine. No wiring neces-
sary. Just plug in and
operate. Plenty of current
for any oil burner, freez-
er, brooder, emergency
lights, etc. which require
up to 700 watts. Ideal for
Civil Defense, Fire Dept.,
trailers and camps. Com-
plete with voltmeter and
built-in winding to charge
6 v. auto batteries. Item
24, Wt. 85 lbs. Fully Guar-
anteed. Be prepared if war
or storm knocks out power
lines. Reg. **\$143.50**
\$275 value. **\$143.50**

700-800 Watt Plant
(Item 44) same as Item
24 but larger **\$169.95**
engine.....**\$169.95**
1000-1200 Watt Plant
(Item 45) same as Item 24 but
larger engine.....**\$199.50**
350 watts—115 v. D.C.
powered by a sturdy, easy-
starting 1/2 hp. Briggs
engine, perfect for lights,
radios, cabins, trailers,
etc. Built-in control box
with receptacle—just plug
in. Wt. 65 lbs. Item 273.
Reg. \$189.50 **\$99.75**

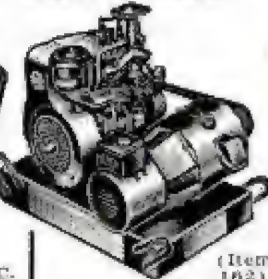


(Item 31)

GIANT 2000-2500
WATT PLANT
115-120 v. 60 cyc. A.C.
Absolutely the best made
—exclusive dynamically
balanced armature; heavy
windings develop up to
5000 watt overload for mo-
tor starting. Skid-mounted
—portable. Powered by easy
starting Briggs or 8 hp.
Wisconsin engine—com-
plete with all accessories;
engine easily disconnected
for other uses. Big outlet
box, voltmeter, no wiring
necessary. Ample current
for all purposes. Factory
warranty and complete
instructions included. Wt.
230 lbs. Reg. price \$585.00.
Special **\$299.50**
at.....**\$299.50**

With Electric Self
Starter.....**\$359.50**
Generator only and con-
trol box. Drive it with
your engine or tractor
\$169.50.

3000-3500 WATT PLANT
(Item 188) 110-220 v. 60
cyc. A.C. with Wis. En-
gine. Push button start.
Wt. 370 lbs. Heavy duty
.....**\$399.50**
Generator only for belt
drive, Wt. 115 lbs. (Item
189A).....**\$239.50**



(Item 162)

HI-LINE 6000

WATT PLANT

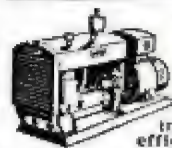
(Item 162) Push Button
Start, 115-230 v. 60 cyc.
A.C. A brute of a
power plant with a rug-
ged 13 hp. Wisconsin en-
gine. Plenty of electricity
for ranges, water heat-
ers, freezers, pumps, ma-
chinery, etc. Affords
both 110 and 220 volts.
Ideal where heavy cur-
rent is needed. Wt. 500
lbs. Easily worth \$895.00.
With self starter,
Factory price.....**\$645.00**

Same plant but with
Crank Start.....**\$585.00**
Item 166.....

Generator and control box
only. belt driven. Use
your own engine or trac-
tor. Wt. 240 lbs. (Item
163) Factory price.....**\$345.00**

We make fully automatic
controls to operate any
of above light plants.
Write for details.

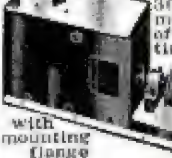
DIESEL LIGHT PLANT



(Item 1600) Diesel
Master—11-12 kw.
115/230 v. A.C.
single or 3 phase.
1800 rpm. direct
connected. Designed
and engineered for
permanent power
installations. Assures
efficient, dependable low
cost operation where
heavy current is important. Wt. 1350
lbs. Regular list
\$3,650.00. Factory price **\$1895.00**
10-11 kw. GAS DRIVEN PLANT. 115-
230 v. 60 cycle A.C. powered by 4
cylinder Wisconsin air cooled gasoline
engine. Direct connected. With self
starter. Constructed similarly to Item
1600. Item 217 wt. **\$1175.00**
900 lbs. Factory price.

HEAVY DUTY D-C

ARC WELDER



Use as portable or
shop welder. Up to
3000 amps. Senior
model. Made for years
of trouble-free, con-
tinuous service. Will
handle light or
heavy jobs. Easily
welds up to 3/4" plate us-
ing 1/4" rods. Built-in air
cooling system.
Arc is easy to
strike and hold, because of specially
designed arc stabilizer. Hi-lo switch
and dial control gives wide range of
welding heats. Run welder at 2800
rpm. with tractor, jeep or 15 hp. gas
engine, or 7 hp. elec. motor. Com-
plete with instructions, guar. and
double V belt or flat pulley. You can
pay more, but you can't buy a better
welder. (Item 38) Wt. 110
lbs. \$400 value at.....**\$99.75**
DUAL CONTROL MODEL same as
above but with built-in dual rheostat
for low heat soldering.
brazing, welding. Spec. **\$119.50**
WELDING KIT. Two 10 ft. leads,
welding helmet, electrode holder,
ground clamp. Sold
only with welder at.....**\$10.50**
Write for prices on A.C. Arc Welders.

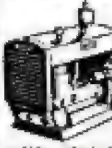
Factory Prices on

Catalog Items

Send 10c for BIG 1953
catalog. Hundreds of
bargains

Prices f.o.b. Factory. 10 day Money back guarantee. Send check or Money Order

DIESEL ENGINE



GET QUICK DELIVERY

SAVE BIG MONEY

Powerful, smooth run-
ning for industry, farm,
irrigation, saw mills,
pumping, etc. Econom-
ical operation, cutting
costs to the bone. Elec-
tric starting. Complete
with clutch. Power take off. Ready
to run. Best made. Easy to start.
Factory priced to save our customers
big money. Order from these four
rugged units or write for complete
details:

27 Horse Power Engine.....**\$895.**
42 Horse Power Engine.....**\$1,095.**
50 Horse Power Engine.....**\$1,355.**
72 Horse Power Engine.....**\$1,795.**

MASTER AIR COMPRESSOR



(Item 208) High pressure
type for large
volume of air
for heavy duty
service. For
paint spray-
ing, in-
flating
truck and
autotires,
greasing,
and the
hundreds of
other jobs
done by com-
pressed
air. Piston
type. 2" bore
compressor
with built-in
air filter. Master built with hi-strength
alloys and precision bearings. Stainless
steel tank, 12"x24", 2100 cu. in. cap.
Safe up to 500 lbs. Equipped with auto-
matic switch that starts and stops motor
to maintain desired pressure (up to 160
lbs.) and check valve, safety valve,
gauge, shut-off valve, 20 ft. air hose
and tire chuck. Beautifully balanced on
ball bearing wheels and rubber tires.
Low factory prices. With 1/2 hp. 110 v.
A.C. motor (Reg. \$175.00) **\$98.50**
(Item 209).....
With 1/2 hp. motor, Reg. **\$119.50**
\$190.50 (Item 209A).....
With 2 hp Briggs Gas Engine (Reg.
\$199.50) **\$109.50**
(Item 209B).....
Write for prices of compressors only. A
complete line of spray guns and air
tanks available.

NEW MOTOR BIKE



Our Commando Motor
Bike is trouble-free—
carries amazing 5
yr. guarantee. Goes
to 160 miles per
gal. on all
roads. Speed
to 40 mph. No
oil or gas
fumes. Easy
automatic ped-
al or pull starting. Has new prin-
ciple of automatic transmission.
No belts or chains—power trans-
mitted directly to rear wheel. Ac-
celerates quickly. Get free folder.
Complete motor and kit ready to
attach to your bike in 1 hour.
Factory Price.....**\$125.00**

Variable Speed Selector



Heavy duty, made
by B. F. GOOD-
RICH for indus-
trial use. Pro-
vides instant
speed changes
for any drive.
For machine
tools, dryers,
printing, con-
veyors, produc-
tion lines, hoists
—any operation
requiring vari-
able speed. Ideal
for midsize au-
tos. Employ a
reliable "trou-
ble free" plane-
tary system. No
losses or creep-
ing. Infinite range, smooth
operation, easy installation (data
included). 3 sizes: 1-1/2 hp. wt.
36 lbs.; 1-2 hp. wt. 55 lbs.; 2-3
hp. wt. 105 lbs. Reg. list \$228,
\$252 and \$352. Our prices...
\$79.50, \$89.50 and \$114.50.

VENTILATING FAN



(Item 10) Mount
in wall or ceiling
to ventilate any
area. Over range,
removes kitchen
smoke and odors.
Easily installed in
furnace pipes.
Forces even heat
to all rooms. Pow-
erful continuous
duty motor, 110-
120 v. A.C. Quiet, super efficient
fan moves huge volume of air (400
to 600 c.f.m.) 8" Fan, wt. 5 lbs.
\$6.85; 10" Fan, wt. 6 lbs. \$7.85;
12" Fan, wt. 7 lbs. \$8.85; 14"
16" Fan, wt. 8 lbs. \$9.85.
HEAVY DUTY FAN. Semi-en-
closed motor, suitable for spray
booths, restaurant exhausts,
poultry houses, and other appli-
cations. 10" Fan, wt. 8 lbs.
Item 10E.....**\$11.95**
12" Fan, wt. 10 lbs. **\$12.95**
Item 10B.....
Item 10D.....

EXTENSION CORD



(Item 16) 40
ft. heavy
duty, made
of specially
insulated
No. 14 2-
conductor
wire. So
tough that
you can drive over it and yet flexible
and easy to handle. Resists oil,
grease or water. Extends elec-
tricity up to 400 ft. without vol-
tage drop. Use indoors or out.
Complete with heavy rubber plug
and outlet. Wt. 2 1/2 lbs. Usually
\$4.50—Special 40 ft.**\$1.99**
Comb: 2-40 ft. and 1-20 ft.
(total 100 ft.).....**\$4.95**
100 ft. length (one piece) **\$4.85**
WIRE ONLY (Item 50)
No fittings. 100 ft. **\$4.00**

Heavy Duty Power Cable

#12-2 Cond.—stranded, very
flexible, rubber covered, special
outside conductor for grounding
power tools, etc. Finest heavy
duty power cable made. 50 ft.
(Wt. 8 lbs.) Item 190.....**\$6.95**
100 ft. (Wt. 16 lbs.)
Item 200.....**\$12.95**

HYDRAULIC JACKS

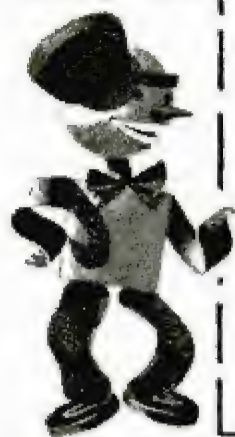


Heavy duty, precision
built, smooth, positive
acting with built-in
relief valve. Hi-lift
with screw extensions.
Govt. surplus at a frac-
tion of orig. cost.
(Handle included.)
3 ton (Item 208A)
Wt.**\$9.45**
15 ton (Item 208B)
Wt.**\$11.45**
208B Wt. 17 lbs.

Prices f.o.b. Factory. 10 day Money back guarantee. Send check or Money Order

MASTER MECHANIC MFG. CO., DEPT. 36-C Burlington, Wis.

"Handy" SANDY says:



You can always use a

**GOOD
SHORT-CUT**

... here are some
you'll prize!

Fixing bulges in linoleum calls for a really sharp knife and some good fresh linoleum paste. Slit the bulge, slip in a good supply of paste with a narrow-bladed knife, then put a heavy weight on the slit and leave it overnight.

Whether repairing linoleum or laying it, your knife **MUST** be sharp. I've seen plenty of people hurt because a dull tool slipped. Sharp tools are far safer to handle, because they'll do exactly what you want them to do. A No. 109 Combination Stone by **CARBORUNDUM** will keep them sharp and is basic to your tool collection... economical to buy—long lasting. Your hardware store or lumber dealer has a wide range of sizes for you to choose from.

Masking tape has so many more uses around the house than its original purpose of letting you get a clean sharp painting edge. For instance: criss-cross two short strips on plaster or wallpaper walls... drive your picture hanger at the point where they cross... no chipped plaster or torn wallpaper. It's a perfect mender for torn window shades and paper lamp shades. Use it for home canning labels—for smoothing the grips of rough or splintered tool handles. A gentle hint: ask your hardware store or lumber dealer for **FLEXBAC Masking Tape** by **CARBORUNDUM**. (No, all masking tapes aren't alike. You want one that goes on easily, holds firmly as long as you want it to stay, and peels off cleanly without leaving a trace. That's **FLEXBAC Tape**.)

You can't plane a plywood edge—so if a cabinet door binds, try a piece of Extra Coarse Flint Paper (wrapped around a 3"-square block of $\frac{1}{4}$ " wood to save your fingers). Works fine. Another good product by **CARBORUNDUM**. Matter of fact, **CARBORUNDUM** makes five outstanding Flint Papers: Extra Fine—Fine—Medium—Coarse—Extra Coarse. A few sheets of each on your workshop shelf will equip you for any refinishing job in the house.

What home upkeep short-cuts have YOU discovered that other folks would like to know about? Send 'em to me on a postcard — a separate card for each idea — and I'll pay you \$5.00 right away for every one I can use in later columns. Even if I can't use 'em (on account of duplicates, and such) I'll send you a worthwhile little gift for your trouble.

Better send me a postcard anyhow, and ask for a fine new booklet, "REFINISHING WOOD FURNITURE," which the **CARBORUNDUM** folks have just printed. There's no charge. Just address your card to me



"Handy" SANDY

CARBORUNDUM

Niagara Falls, New York

"CARBORUNDUM" AND "FLEXBAC" ARE REGISTERED TRADEMARKS OF THE CARBORUNDUM COMPANY, NIAGARA FALLS, NEW YORK

90-34

wheels turning the moment one of its pilots is in trouble anywhere in the world.

Upon his return to the ship a meeting of all pilots of the air group was held. He addressed the gathering, giving a lecture on his experience. Thus, the important step of on-the-spot correction was made for the benefit of the other pilots.

He began his speech with, "This was the most eventful eight hours of my lifetime." It had been his third combat mission. "The Mark III suit saved me, I believe. It kept me dry and warm while wading in so much freezing water and plowing through the snow-covered fields."

In mentioning his failure to light a flare immediately he said, "I would surely set off one flare as soon as I got free of my plane to assure rescue pilots I was okay and to ascertain that they really had me in sight. I would also retain flares to be used when I was sure the helicopter crew could see my location."

He blamed himself for the gun's failure by telling the pilots, "I neglected having my pistol winterized. I recommend that all pilots entering the combat zone in winter weather... have that done before flight. The oil in my gun froze easily."

Following his talk there was a question-and-answer period. Since most pilots, like professional baseball players, go over in their minds what they will do if confronted with a certain play or situation, this is the way each pilot finds out if his own ideas of evading will work under similar conditions.

When the serious discussion was over the rescued pilot came in for a good-natured roasting.

The pilot's lecture is followed by endorsements from all units involved including that of the ship's surgeon. He is primarily interested in safety devices—belts, shoulder straps, crash helmets, exposure suits, what benefit they were in preventing serious injury and how they can be improved. It is also through the efforts of medical officers that mental and emotional factors are found which many times are the real cause of accidents.

Since all these reports are forwarded via a chain of command, the Fleet Admiral may find that a number of his planes have been shot down after having attacked a target in a similar manner. The admiral will then initiate a letter to all his flying commands, explaining in detail how the enemy is knocking down attacking planes who follow a definite pattern.

Finally, the report arrives in the Naval Aviation Safety Activity at Norfolk, Va., where a group of pilots, under Capt. Frederick Funke, Jr., USN, delve into the facts.

(Continued to page 282)

For The Smoothest, Most Perfect Finishes USE DREMEL **STRAIGHT-LINE ACTION** SANDERS

Only Dremel Offers All These Features:

WORLD'S FINEST FINISHING SANDERS—Patented Straight-Line Action sands with the grain of the wood—eliminates cross grain scratches and orbital swirls.

MORE SANDING SURFACE PER DOLLAR means more work done. Faster action (14,400 sanding strokes per min.); more than three times as fast as other type sanders!

POWERFUL, high-speed, lifetime reciprocating motor (110 V. 60 cycle A.C.)

EASY, ONE-HAND OPERATION less tiring on vertical and overhead operations. Sands into corners—other tight places.

TROUBLE-FREE USE assured. Only two moving parts; never needs oiling. No armatures, brushes, gears or bearings to wear out and replace.



FREE SANDING GUIDE

A handy, 16-page "How-to-do-it" booklet containing helpful hints on sanding and refinishing procedures packed FREE with each Dremel Sander. Extra copies, 25c.

MAKE THIS SIMPLE TEST!

Sand a piece of wood, by hand, using the four different sander motions illustrated below. Note how the slightest cross-grain action produces scratches and swirls... how sanding *with-the-grain* leaves a scratch-free, satin finish. This test proves conclusively why professional craftsmen always sand with the grain of the wood... never cross grain. **YOU BE THE JUDGE!** If you are not 100% convinced that Dremel straight-line action is the finest, most effective sanding method known, we sincerely don't want you to buy.



A "must" for sanding dry-wall joints. Fast—cuts refinishing time in half.



Sands right into tight corners.



Prepares furniture for repainting.



MODEL 2000

Heavy-duty model: 21 sq. in. (31 1/4" x 7") sanding base. Price includes sturdy steel storage case, 25 asst'd. abrasives, polishing pad.

\$24.50

MODEL "A"

Hobby and household model sander, polisher, massager (above, right): 12 sq. in. (23 1/4" x 5 1/4") sanding base. Price includes 6 abrasives: 3 polishing pad, 3 massager pad.

\$14.85

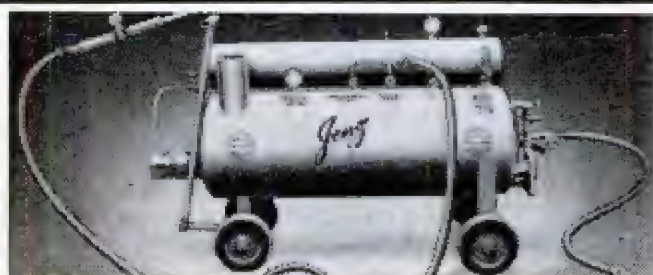
SEE YOUR LOCAL DEALER: Dremel Tools are sold at better dealers everywhere. If your dealer can't supply, order direct on a five-day trial, money-back guarantee.
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Remit in full, and we will ship postpaid. Or, send only \$2.00 now, pay postman balance plus postage and C.O.D. fee.

DEPT. 113-D

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On December 1, 1951, NASA was established to help minimize the possibilities of pilot error. Every time an accident happens to a naval plane the report is sent to this activity.

When the final recommendations are made to CNO the results are sent to all flying commands. The job of making flying safe does not stop here. The medical section of NASA maintains records of accidents in which pilots or crewmen are injured or killed. Also, by keeping a running analysis of the facts gleaned from reports where aviators have had to abandon their planes by parachuting, using ejection seats, crashing into the water or coming down on land, this section is able to brief all pilots on the latest survival information.

The medical section played a lead role in developing the antiexposure suit worn by aviators.

A flight surgeon in Washington, who acts as liaison officer, reviews all suggestions and keeps the top echelon of the Navy informed of all proceedings.

From time to time the medical section of NASA is ordered to make a statistical check on specific equipment being used in combat, taking into consideration the effect of air and water temperatures and any misuse or reported defects. Of utmost importance are the pilot's recommendations.

Concentrating on reducing the accident rate in naval aviation is the task of NASA. So when you hear those planes zooming overhead, remember that the pilot who would rather use the airways than the highways owes much of his confidence to a little band of deskbound experts. ★ ★ ★

Nylon Knee-Cap Liners Help Arthritics

Nylon, in thin sheets, is being used to line the under surface of the knee cap in arthritic patients. Small stainless-steel staples fasten the nylon sheet to the bone. The resulting low-friction surface permits the joint to move freely and comfortably. Performed on only one knee in the trial operations, the surgery permitted patients to move around without help after six months, needed to get good function in the joint and adequate strength in the thigh muscles. The group of Boston physicians who introduced the method reported success in 58 of 78 operations.

ⓄMilitary planes are getting heavier all the time — a new Navy fighter weighs more than a standard twin-engine commercial airliner complete with its two pilots, hostess, 21 passengers, their luggage and the usual mail load.



on every Pontiac ever built



1926 PONTIAC



1931 PONTIAC



1936 PONTIAC



1953 PONTIAC

AC Spark Plugs—original equipment on the first Pontiac car—have been Pontiac's partner ever since 1926. AC's patented CORALOX Insulator is one big reason for this preference. CORALOX gets hot quicker to burn away oil and wet carbon deposits . . . resists deposits of oxide coatings—stays clean longer . . . provides four times greater heat conductivity . . . has three times the mechanical strength . . . offers ten times greater electrical resistance at high temperatures.

For Pontiac owners—and owners of all other makes of cars—these outstanding CORALOX advantages mean—GREATER GASOLINE ECONOMY—SMOOTHER PERFORMANCE—LONGER PLUG LIFE.

**Original Equipment on
Nearly as Many New Cars
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Four Wheels Waiting for a Face Lifting

(Continued from page 110)

The easiest way to customize a car is simply to give it a unique paint job. As long as you don't use a stock color, your car will stand out from all the others of the same make and year. Any good paint shop can mix standard metallic colors to create any shade desired. Purple, for one, is an uncommon automotive color and so some shade of purple often is selected for a custom paint job. Applied in 20 to 30 coats, the paint has a depth and transparency that gives it almost the effect of a ceramic finish.

The paint job comes last, of course, if you are making other changes as well. Removing the hood ornament and the chrome decorative stripes calls for welding the attachment holes shut and filing down the rough metal. Then the car is ready for its paint job.

If you want to go a step further, you can give your car a one-piece body by welding all the construction joints together, including the seams that separate the fenders from the body. Next, with copious amounts of body solder, the whole line of each seam is filled in, then filed down to a smooth contour. Painted in a single color, the one-piece body has a finished appearance that sets it apart on the street.

Few of the custom cars have handles on the doors or on the rear deck lid. You can remove the handles, weld the openings closed, and install electric solenoids inside the door panels to pull the latches. The solenoids are operated from inside by push buttons, from the outside by microswitches concealed from view or by an ignition-type lock that fits your ignition key.

The restyling details above are comparatively easy; when you get into major changes you'll need to do some real engineering. Each step brings on problems that you might not have considered when you started to remodel.

Cars equipped with leaf springs can be lowered several inches by placing metal blocks between the axles and the springs that are attached below them, using longer shackle bolts. Channeling is a different procedure and consists of lowering the body on the frame itself. To reduce the height of the body even more calls for literally sawing the body in two, horizontally, removing a band of metal all the way around, then welding the top and bottom together again. Tops are "chopped" in the same way.

Those details are only part of the job.

(Continued to page 286)

"Pine Panel" your kitchen

the low-cost Gold Bond way!



"Here's how this barn of a kitchen ought to look!" My wife told me, brandishing a copy of the Saturday Evening Post with a Gold Bond ad in it. It was a knockout of a kitchen, all right, but I was afraid it was too expensive for us. All that wood paneling made it look like a millionaire's dream.



Our Gold Bond dealer showed us Gold Bond Gypsum Grainboard...the inexpensive wallboard that looks like natural wood paneling. He figured the amount needed—and helped plan the room.



We started by nailing "filler strips" to make the wainscoting and upper wall even, so the final grainboard wall would be flush from top to bottom. The dealer gave us simple instructions to follow.



Then we nailed up planks of Gold Bond Gypsum Grainboard with a finish that looks just like knotty-pine and gives the walls a "fine antique" look. Planks are lightweight and easy to handle. You can saw and nail as easily as wood. Best of all, gypsum is fireproof.



Gold Bond Gypsum Grainboard gave us an expensive-looking kitchen at little more than ordinary wallboard cost. And at the same time, made it easy for us to do our own remodeling.



Besides Knotty Pine, there's new rich-toned Dark Walnut and warm Bleached Walnut. Nails match the finishes. See your local Gold Bond lumber and building materials dealer today—or send 10c for a copy of "Remodeling Magic."

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Fireproof Wallboards, Decorative Insulation Boards, Lath, Plaster, Lime, Sheathing, Roofing, Siding, Wall Paints, Textures, Masonry Paints, Rock Wool Insulation, Metal Lath and Sound Control Products.

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Easy...with Actionrod!



Want tip action? Actionrod's got it—tip action for accuracy, for distance, for perfect bait control.

Want live action? Get Actionrod—the right tip action for spinning, fly-fishing, bait-casting—in tubular glass or solid, at the price you want to pay, \$4.87 to \$75.00.



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ORCHARD
INDUSTRIES, INC.
HASTINGS, MICH.

When you channel a body you also must cut away the floor panels and the firewall, among other items, and then refit them. The steering column must now be slanted at a greater angle and reattached to the instrument panel with a handmade bracket. In turn, the seat must be lowered to give you room behind the wheel.

In channeling, too, the body must be cut away inside the rear fenders to prevent the wheels from rubbing. Often it's necessary to cut away parts of the front fenders to give the wheels clearance for turning corners. The bumpers should always be reattached at conventional height so they match the height of the bumpers of other cars. This requires cutting new holes through the body panels to reach the frame.

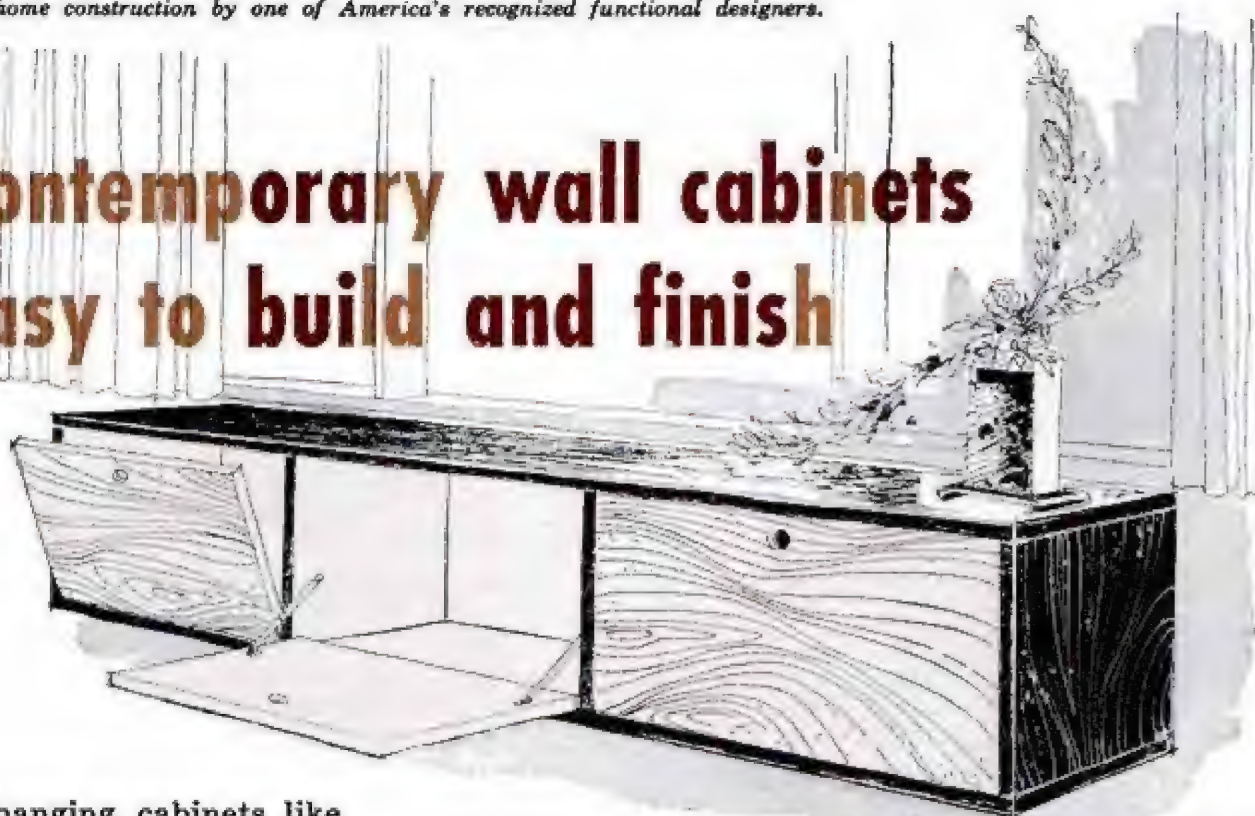
Styles can be carried to an extreme, of course, and one of the trends in custom cars is the so-called "drive in" car whose body has been lowered so much that its rear almost drags on the pavement. Such a car is impractical for almost everything except going to a local drive-in cafe or theater. In some cases, the rear of one of these cars is so low that a metal skid or set of rollers is attached under the body to help assist it over bumps in the pavement. These cars have been called everything from "unfortunate" to "horrible" but their owners regard them as the best examples of restyling in the world.

Custom enthusiasts are getting used to seeing the major factories adopt ideas that were first tried out on individual cars. Exhaust stacks through the bumpers, removable hardtops and floating grilles, "frenched" head and tail lights that peer out from the body all started with the customs, they say. Next, possibly, the factories will adopt other custom details such as more push-button controls, rounded corners on doors, decks, and hoods, taillights on the bumper guards and "continental" spare tires mounted on the rear. Meanwhile, the leading designers in the custom field have little to say about future trends. Probably they don't exactly know what the trends will be, except that many owners will continue to seek styles that are different from the stock automobiles of the current year.

If the lines and workmanship are good, the owner of a custom car often makes a profit when he decides to sell. One '49 Mercury that cost \$1500 brought \$3900 a year after its owner had completely changed its appearance. And there's the case of the '40 Merc that brought \$2000 after its owner had bought the original car for \$295, spent \$1000 in revamping its lines, and had driven it for a year. There's always a good market for a good custom car. ★ ★ ★

This is another in the series of contemporary furniture selections, developed for fairly simple home construction by one of America's recognized functional designers.

Contemporary wall cabinets easy to build and finish



Designed by Kim Obata

Wall-hanging cabinets like those illustrated here are daily becoming more popular with home owners and hobbyists building their own furniture. They add a modern decorative note—are quite functional—occupy no floor space—can be built to almost any desired dimensions.

The design of this model cabinet provides for three separated storage areas. Inside dimensions of each area are 9 inches x 10 inches x 24 inches. Wood is 1-inch birch—either solid or plywood. If plywood is used, solid birch strips $\frac{1}{8}$ inch x 1 inch (you can buy them at a lumber yard) can be used as facing for exposed edges. Door hinges are practically con-

cealed by their underneath mounting.

Wood surfaces are finished with two different Rez products. Top, bottom and ends are given a coat of clear Rez, with a finish coat of "hand-rubbed-effect" varnish. For contrast, doors and inside areas are finished with any of five beautiful Rez color tones: Cedar, Driftwood, Sage, Redwood, Mahogany, or White (for bleached effects) . . . Rez is easy to apply—can be wiped on with saturated cloth . . . All Rez products seal and prime the surface to which they are applied. Their penetrating

action equalizes the surface density of the wood—preserves beauty of grain by preventing streaks and blotches. Sealing action checks grain raise—minimizes warping, swelling and twisting by keeping out moisture.

At your paint, hardware or lumber dealer—ask for actual "on-the-wood" color samples. Or, write MONSANTO CHEMICAL COMPANY, Merchandising Division, 1700 S. Second Street, St. Louis 4, Missouri. In Canada, Monsanto Canada Limited, Montreal, Toronto, Vancouver.

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This specially designed series of wall cabinets can be easily constructed from standard plywood panels. Ideal for books, magazines, other small objects. Flower pots can be set on top. Send 25¢ for plans and specifications. Use coupon.

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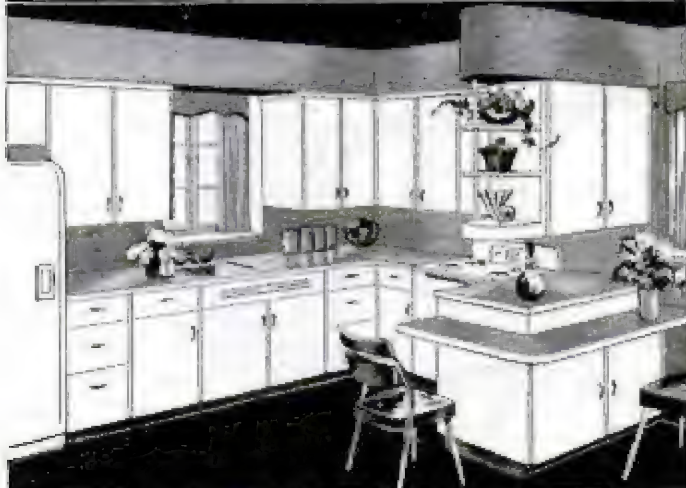
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Your local Lumber Dealer will assist you in the purchase of Bilt-Well Cabinets.



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Why wait to buy what you can have now by doing the assembling, the installing and the decorating yourself? Bilt-Well Nu-Style Cabinets are completely machined, pre-fitted, and ready to put together. Don't wait until you "save up" for a new kitchen, do it yourself and save. Sold by leading Lumber Dealers.

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Address..... State.....
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My Lumber Dealer is..... State.....
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Build Well
with

**BILT-WELL
WOOD WORK**

Recipe for the Farm Mechanic: Take a Jalopy

(Continued from page 118)

homespun method of helping provide 30-to-1 gear reduction.

The emptied belt is brought back by a 1/4-horsepower motor at the stable's rear end. It's connected, via an old washing machine's gear-reduction box, to a Model-A Ford transmission mounted on the floor. This is run in low gear to bring the belt back at 28 feet per minute.

On the other hand, Vernon Bray, poultryman of West Pelham, Mass., tore up an old Pontiac to raise loads instead of pulling them. He says he's "never had anything more useful" than the homemade freight elevator in his three-story hen house. A 1/2-horsepower motor does the job.

It's regulated this way: The jalopy's entire drive shaft was removed, leaving the transmission hooked to the universal and rear end. One wheel is braked. The other runs a drum that winds the 1/4-inch wire rope serving as elevator cable. When the shift is thrown in reverse, the elevator goes up at a comfortable speed of 12 feet per minute. On its return trip for another load it moves faster with the shift in second.

Besides being a natural-born inventor, the farmer is a keen-eyed imitator. He saw how the conveyor idea worked in grain mills and coal elevators, and began building similar "hired men" to take loads off his own back.

Essentially, the conveyor is a motor running an endless chain, although there are other types—as in Lyons' gutter cleaner and in apple-grading machines—where a belt carries the load. Paddles or lugs spaced along the chain move the manure, silage, hay bales or whatnot. But sometimes the chain itself does the job, as in automatic chicken feeders where the grain is carried along by the moving links.

A paddle-type barn cleaner has appeared on the dairy farm owned by the Gibson brothers near Stuyvesant, N. Y. It cost only \$300 in materials, pays for itself every year by saving over 100 minutes a day, not to mention fork-and-shovel labor. A manufactured cleaner would have cost \$3000 and the Gibsons are certain theirs works better. Their most expensive items were two motors costing \$130 and \$60.

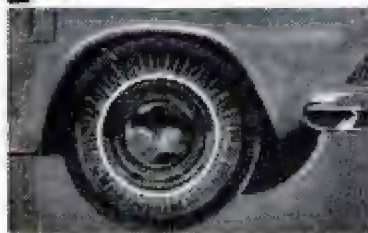
The larger one, three-horsepower, moves 250 feet of chain that circle the barn gutters. It's ordinary 3/8-inch logging chain to which they welded iron bars every two feet. A hardwood paddle is bolted to each

(Continued to page 290)



*The night was dark, his lights were dim
But he could still see LUMA-RIM*

See and be seen with LUMA-RIM®



It is a PROVEN FACT that LUMA-RIM, the bright red reflective wheel trim, puts drivers of on-coming cars ON THE ALERT when your car is crossing street or roadway, or leaving curb at night. PRECISION die-cut ring of finest

material. (Tiny glass beads bonded to plastic.) Reflects light from any angle. Easy to apply. Lasts for years. (Road tested.) LUMA-RIM FILLS A NEED for a distinctive light for the sides of cars. For 15" and 16" rims. Order by tire size. Complete set for four wheels, postpaid..... **\$2.95**

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COMPLETE UNIT—ready for Base and Power. Sell friends—neighbors—dealers. PROVED—by thousands. No tax. Dominate market. SAMPLE (postpaid). Money-back guarantee. Or write quick—for franchise deal. Also, complete mowers. SMITH AGENCY, SA51, Excelsior Springs, Mo.

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The following models have the famous M-Z-B cam lock which guarantees fixed and never shifting setting when pressure lock is released.

30-61	Chrome Steel	.001" & 1/128"	\$14.00
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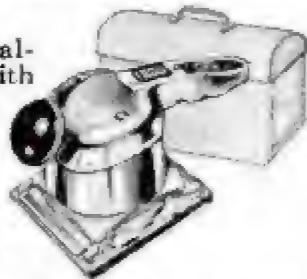
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Build, repair, install, finish or refinish—at your convenience, at low cost. Powerful SpeedTools take the drudgery out of work, help you do "professional" quality work in a hurry.

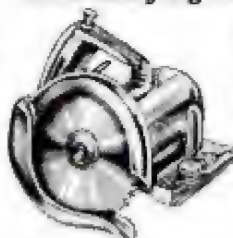
No. 150 SpeedSander

An all-ball-bearing, orbital-motion, finishing sander with powerful 3450 r.p.m., A.C. induction motor and cast aluminum body. **\$34.50**



150-K SpeedSander Kit

The Sander with Accessories including: deep contour pad, finishing plate, felts for free abrasives and wet rubbing, lamb's wool bonnet, 90 sheet abrasive covers, etc. in fitted steel carrying case. **\$49.50**



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1/4 H.P. Universal Motor, cast aluminum housing, safety shut-off switch. Cuts all angles to 45°, any depth to 1 1/4" **\$29.95**

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Extra power, high speed, electric drill with cast aluminum cases, and geared chucks.

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bar. The conveyor moves 12 feet per minute. The motor's drive is slowed down to that pace by two gadgets—an old Ford rear end and a discarded gear reducer which had been in a bakery's dough-mixing machine.

The manure is brought to a pit where a second conveyor picks it up and moves it 60 feet per minute up a ramp for dropping into the waiting manure spreader. Here the gear reduction is provided by a pulley wheel and another Ford rear end.

Another use for a rear end was found by Lucien Plouffe, West Cornwall, Vt. It gave him a two-ton trailer for lime and fertilizer—not just for carrying the stuff but for spreading it, too. He mounted a hopper at the back on top of which he built a sharp-pointed frame that automatically breaks open the bags of fertilizer that are dropped on it.

At the hopper's bottom he placed an agitator and an eight-finned revolving spreader. It's the jalopy's differential that spins the mechanism.

An old car can do much more than just provide gears. On his homemade feed conveyor, poultryman Harry Van Demark, Walpole, N. H., has a ½-horsepower motor lifting three bags per minute to the second floor of his hen house. He got gear reduction this way:

From the motor's two-inch pulley to a Model-T car wheel; from a 2½-inch sprocket on the other end of this countershaft to a big outer sprocket wheel which came off an old potato planter; the sprocket wheel is attached to another Model-T wheel and its axle, which works the pair of sprockets carrying the conveyor chain.

The Anderson brothers, Castleton, Vt., take the weight out of lifting milk cans by using a ½-horsepower motor to hoist them between floor and cooler. They used two tricks. A rope wound once around the hoisting drum serves as a "clutch." When pulled, it grips the drum and lifts the can. The whole works swings on a wall pivot that once was the drive shaft of an old Nash.

Then there's Wayne Hager, the Vermonter who wasn't satisfied with store hardware when building his new barn. He dug into his jalopy box. On the four doors he installed the handle mechanisms of a 1927 Buick that he had converted into a self-propelled buckrake.

With those handles, the barn doors snap shut easily. Cows can't nudge them open from the outside. The entire barn can be locked like a car—three doors from the inside and the fourth with the key. And when he trips the inside catches, Hager can go about his milking without salesmen barging in to bother him. ★ ★ ★



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• Turn your spare time into CASH—sharpening saws with a Foley Automatic Saw Filer pays up to \$3 or \$4 an hour. You will find you can make \$20 to \$30 a week in your spare time as a starter.

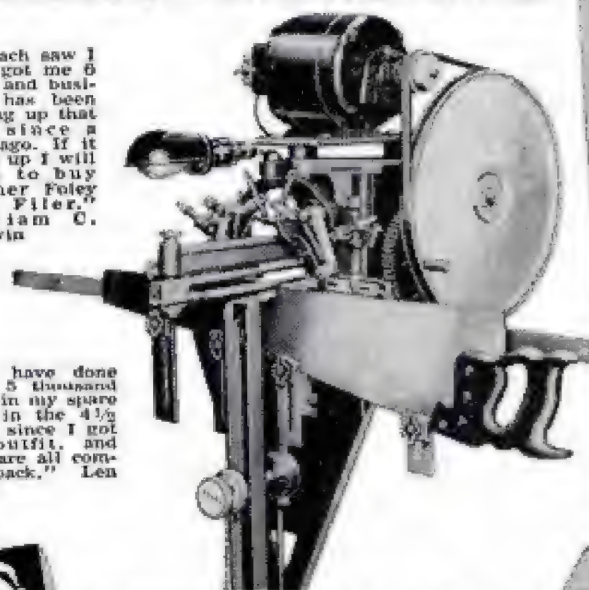
You can work in your basement or garage—no experience necessary. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons. No canvassing—"I advertised in our local paper and got in 93 saws"—says M. L. Thompson. The Foley is the only machine with which you can file all hand saws, also band saws and cross-cut circular saws.

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Here's how for home painters



Touching up around house or yard? For an easy-to-carry paint container with built-in brush rest, cut a large piece out of a turpentine can as illustrated. The can holds the paint; the cut-out holds the brush. Try famous Devoe Wonder-1-

Coat House Paint for fast touch-up—covers completely in just one coat.

Simple way to clean hands!

Before painting, 1) rub hands well with linseed oil, 2) scrape fingernails over a cake of soap. After painting you'll find paint practically wipes off. Painting inside? Devoe Wonder-Tones are rubber-base paints—wash hands, equipment and splatterings with water.



Outside is best! A paint bucket hanging outside ladder is easier to get at and safer than one hung between the rails. Make your own S-hook by twisting wire coat-hanger as illustrated. Remember—for outside, better use Devoe Trim and Shutter Colors. Last for years.

Paint a play place for children!

On a section of your basement floor or on a table top, help your kids paint a whole section of country—roads, lakes, fields, rivers. The kids will have fun doing the work, you'll keep the youngsters occupied on rainy days. Best paint to use is Devoe Mirrolac Enamel, easy to apply, fast-drying, durable.



For repainting the outside of your home use Devoe Wonder-1-Coat House Paint . . . gives 2-coat beauty and protection in just one coat, cuts repainting time and costs practically in half. Your Devoe dealer (in Classified Phone Book) will be glad to help you with all your painting needs.



a quantity of Mexican jumping beans."

The shop has long been the haunt of the famous. It has lured by the hour Irvin S. Cobb, Will Rogers, Ernie Pyle, J. Edgar Hoover, Jack Dempsey and others. Among James' most treasured letters is one from Mrs. Warren G. Harding. In it, she told how much pleasure the late President got out of his visit to the shop in 1923—just before he sailed on the Alaskan trip during which he became fatally ill. Bob Ripley, the cartoonist who devoted his life to the unusual, made many trips to the shop.

"Bob's trips were always preceded by a telegram," said James. "He wanted to visit the shop at odd hours when there were no crowds, and he could study the curiosities without distraction. Sometimes his calling hour was six a.m. But I was always glad to open up for Bob."

And every now and then Hollywood, despite its huge prop rooms, calls. Most recent request from a motion-picture studio was for some Japanese fish-net floats—ball-shaped objects made of glass and about 18 inches in diameter. James had them.

A large share of the curios comes from sailors short on spending money in port. They know they can get quick cash from James for the oddities they have picked up around the world. Back in the days when sailors went to sea for months at a time, James let them use his shop as a mail-collecting center. For many a seafaring man, Ye Olde Curiosity Shop was his only home.

The fame of the shop beneath the Coleman Dock ferry terminal is such that letters addressed to it in most any fashion are promptly delivered. Some addresses that gave the Seattle postal authorities little trouble include: "Mr. Coleman Duck," "Curio Shop Under Ferry Building," "Yeo Ocurio Shop," and "Alaskan Eskimo Fur Doll Under Coleman Dock."

Although curios—some of them highly valuable—are stacked around the floor and walls like articles in a country store, the theft loss is small. The proprietor, however, is still puzzled about one theft. For 35 years a 250-pound clam shell—about the size of a small bathtub—was parked in front of the shop, day and night. Recently someone stole it. Now there is another one in front of the shop—bolted down.

James figures his greatest tribute came from Dr. Ales Hrdlicka, the late noted anthropologist of the Smithsonian Institution, who for many years traveled to Alaska and the Aleutian Islands in quest of the remains of primitive man.

"The highlight of my yearly trip," wrote the Smithsonian expert, "is always stopping to browse in Ye Olde Curiosity Shop."

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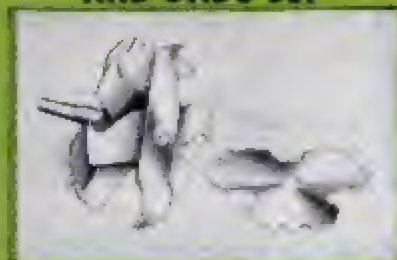
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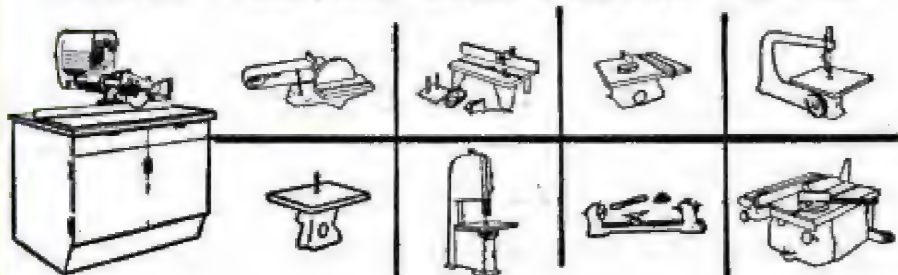
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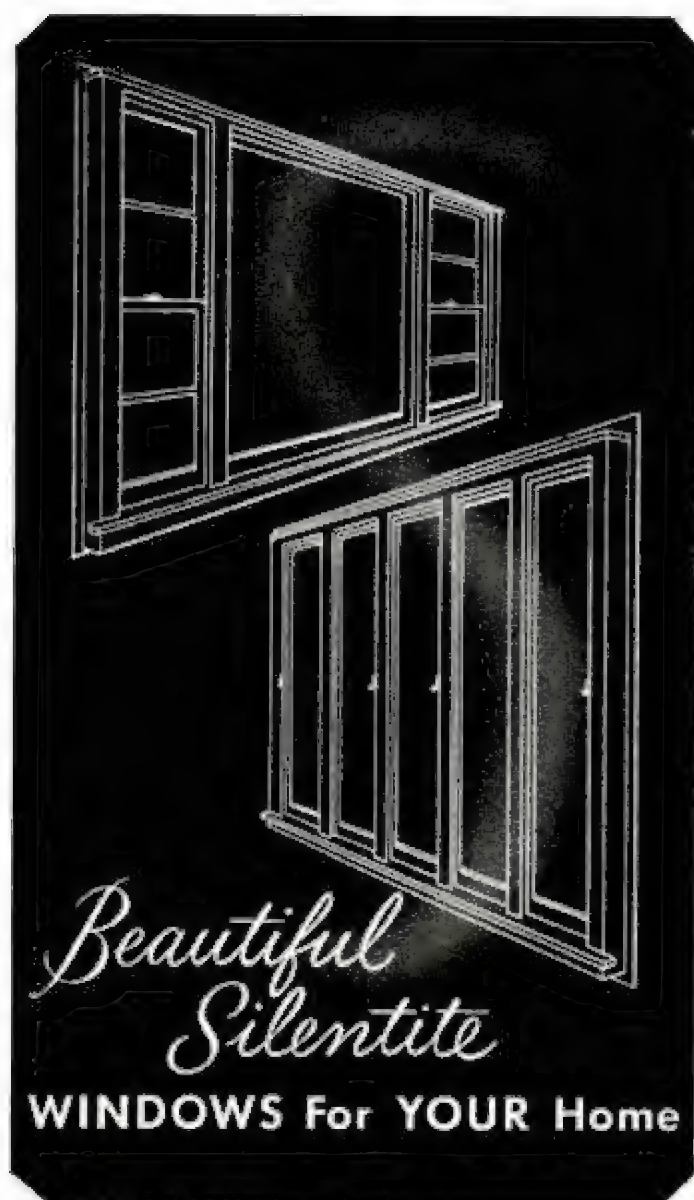
Engineers Look at Foreign Cars"—surely humour of this type is out of place in such a magazine. It was humour wasn't it? I have assumed so because no one who knows anything at all about motor cars could possibly have made some of those statements without bursting into tears—of laughter. . . .

I'm not an engineer—but motorcars are my hobby. First, let me agree with these three authorities of the automotive world on one or two points. The American car industry probably produces, in their price range, the finest engines and automatic transmissions in the world today. Indeed, the products of the automotive industry in America come very high on the list of the world's automobiles for reliability, longevity and running economy. But the attitude of these men must be deprecated when they infer: "If we haven't got it, it's no good." America has as much to learn from Europe, where cars are concerned, as Europe has from America.

In recent years the American industry has far outstripped Europe in the brute power it installs in a vehicle—although let it be noted, not in the power extracted per cubic inch of displacement. Its bodies have become, in most cases, practical, attractive and capacious but its chassis design leaves much to be desired. The statement contained in the interview that Continentals wanted to hurry down a street at 50 to 60 miles per hour, slam on brakes and screech around corners is probably true—it's also true of a large number of drivers on this continent from my observation—the only difference being that the unfortunate Frenchman who drives a car with firm suspension (independent all round, possibly) and has to shift for himself, makes it whilst the American, with his boulevard-ride suspension and "foam-rubber drive," doesn't. Ask anyone who has had to correct a bad skid in a car whose steering takes five turns of the wheel from lock to lock whether he would prefer his steering to be of rack-and-pinion type of $2\frac{1}{2}$ turns lock to lock, despite road reaction. The sooner the car industry on this continent opens up its mind on the subject of chassis design and removes impressions left by the untrue statement in the interview that the firm European-type suspension affects roadability adversely, the better.

Detroit, et al., have good reason for self-congratulation—but none whatsoever for the smug satisfaction your experts so nobly expounded.

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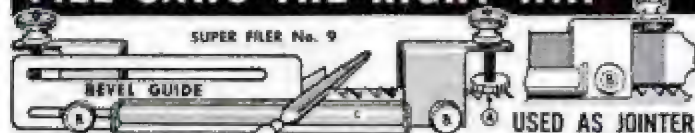
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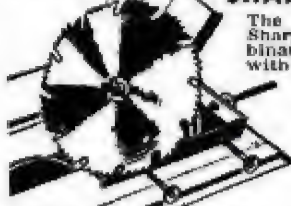


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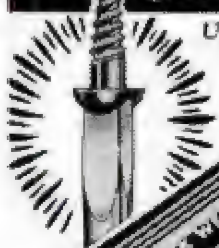


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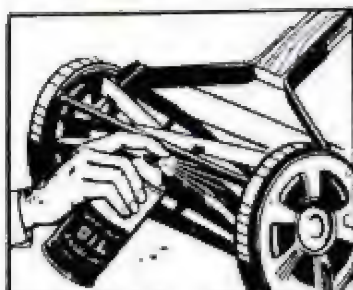


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Permit me to introduce myself, good American friends. I am Hans Jenson, a painter by trade. In Sweden, where the finest paint in the world is custom-blended by master craftsmen, it is an important thing to be a painter. I follow in the footsteps of my father, and his father before him. Fortunate am I, that they handed down to me the jealously guarded secrets of their craft.

For many years, I have worked in many of Sweden's finest homes. People come to me from all over the land because of my own special White Swedish Enamel. It is not like any other Enamel. My Hans Jenson Swedish Enamel dries to a rich white gloss that becomes even whiter each time it is washed. My paint doesn't chip or peel. My friends and customers marvel at it, and for a long time encourage me to offer it for sale. They know there is no other Enamel so good for walls, woodwork, furniture, boats, exterior or interior finishes and wherever fine white enamel is required.

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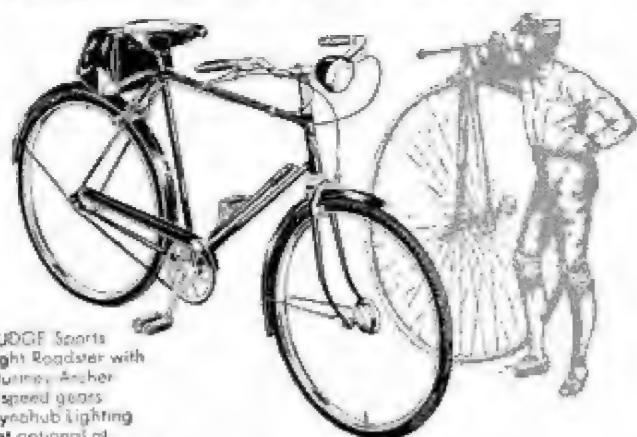
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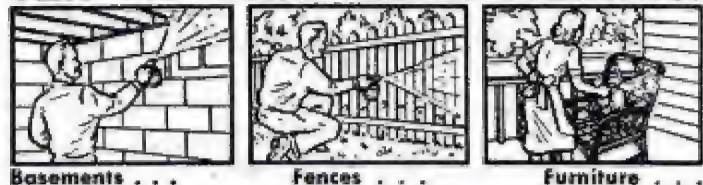


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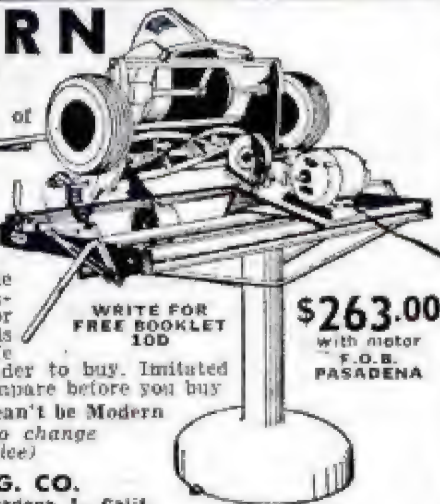


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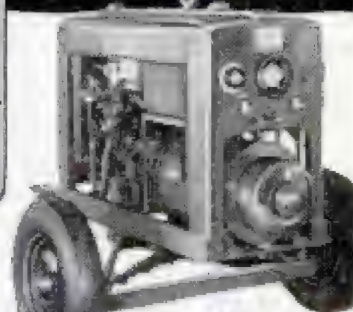
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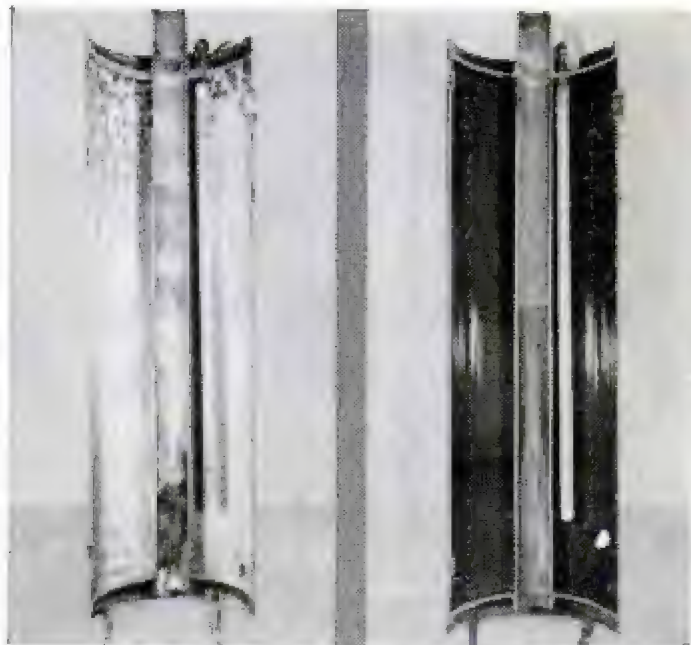
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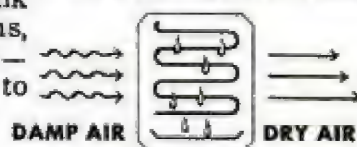
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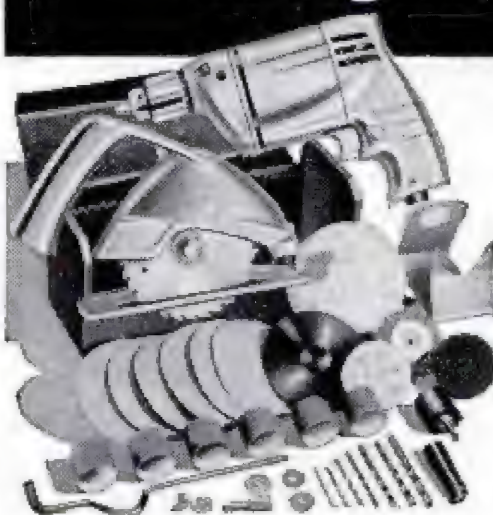


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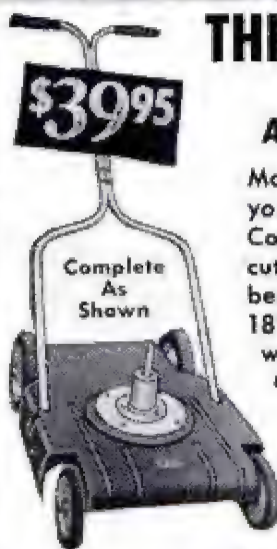
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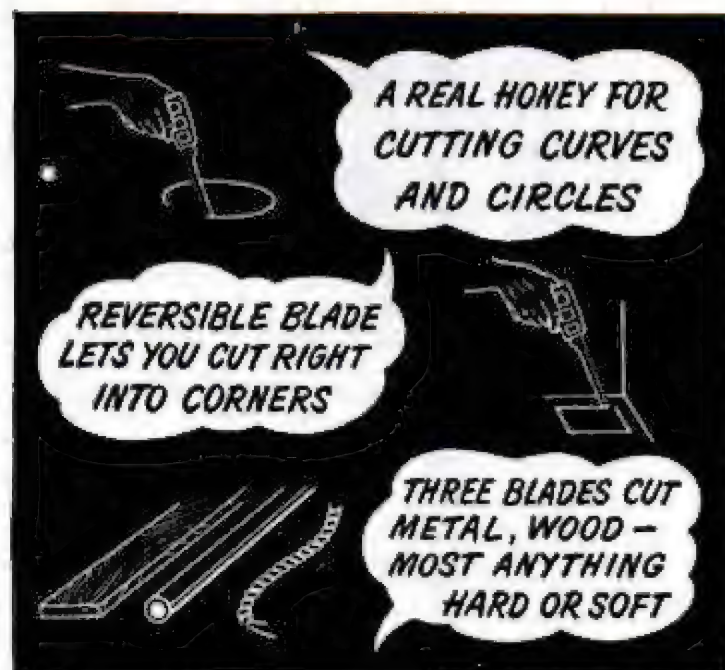
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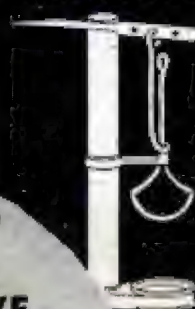
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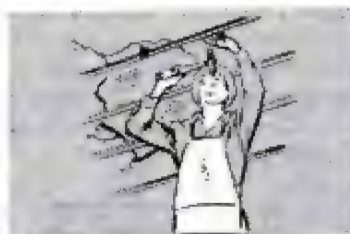
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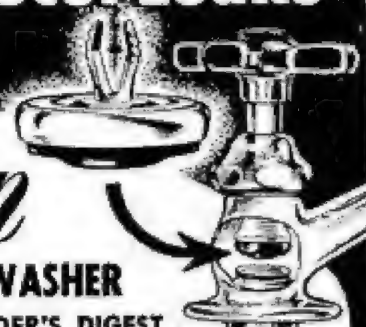
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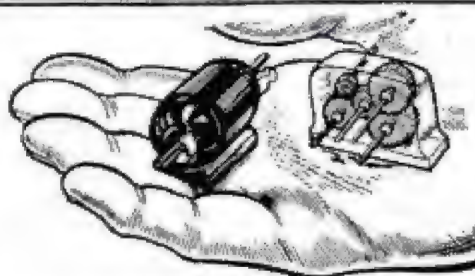
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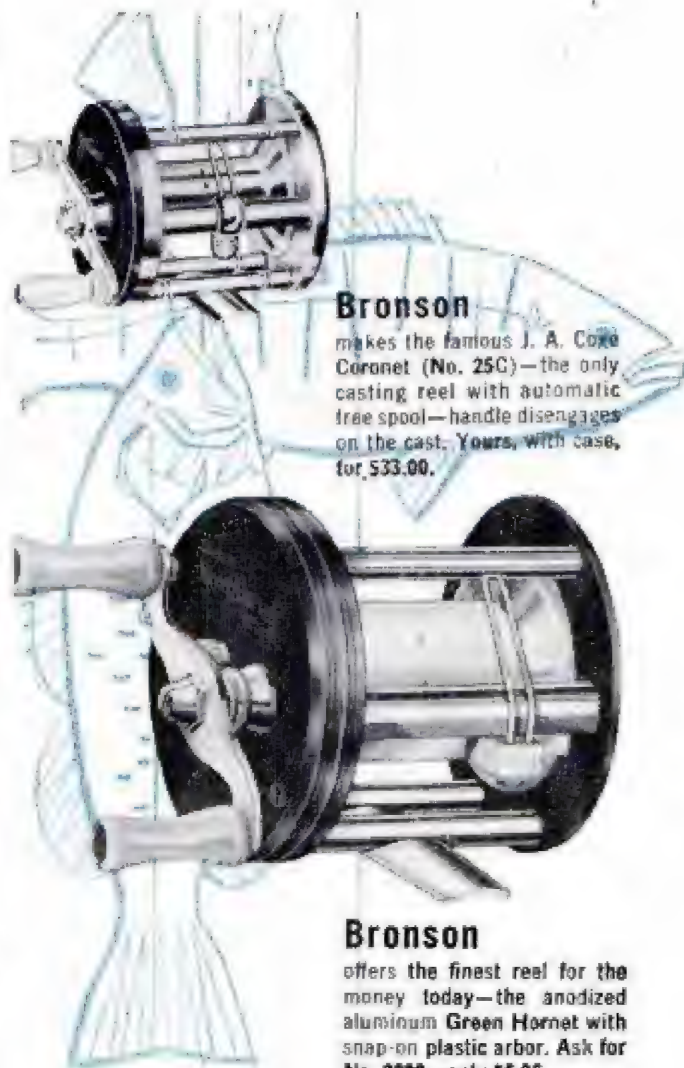
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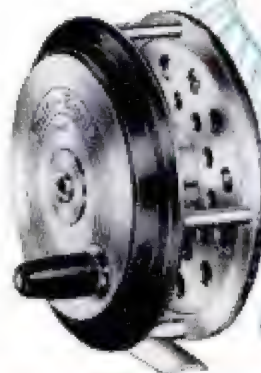
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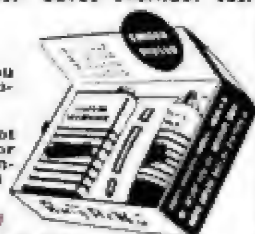
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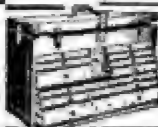
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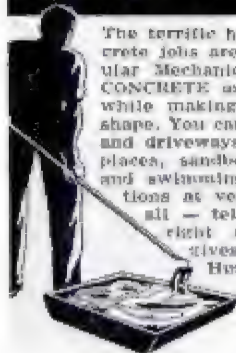
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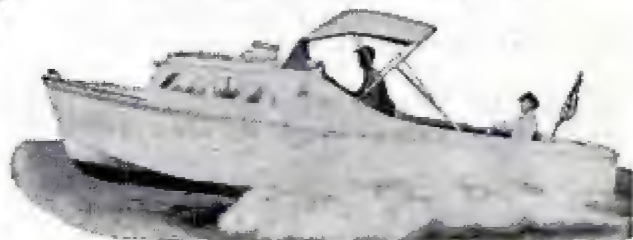
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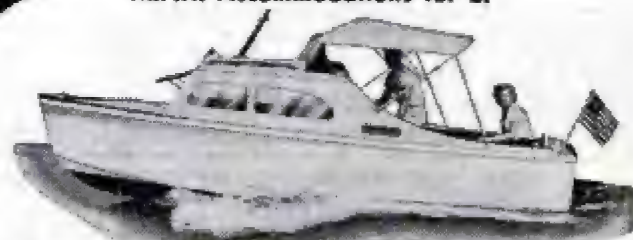
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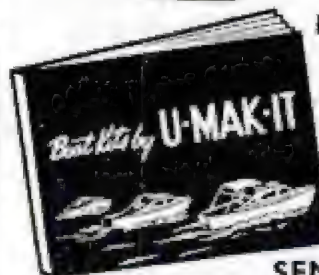


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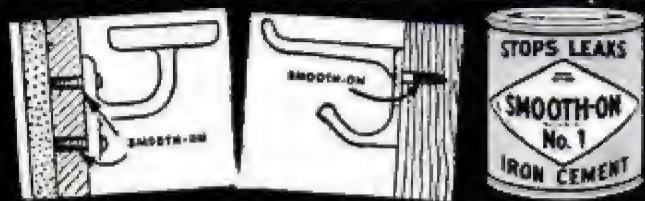
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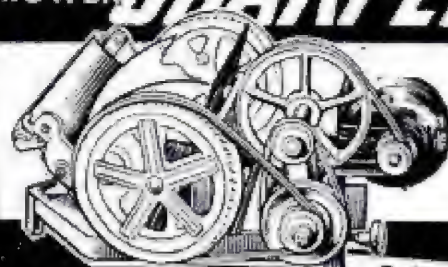
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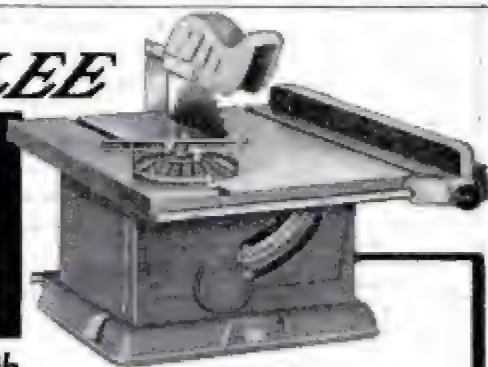
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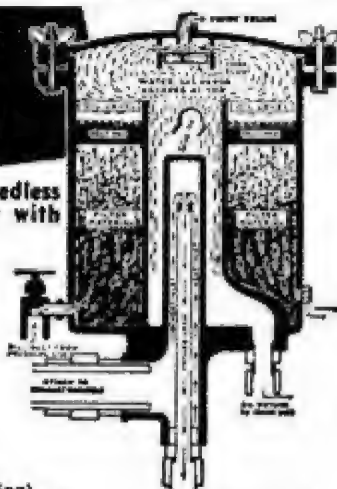
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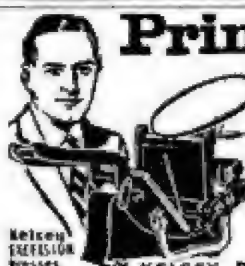
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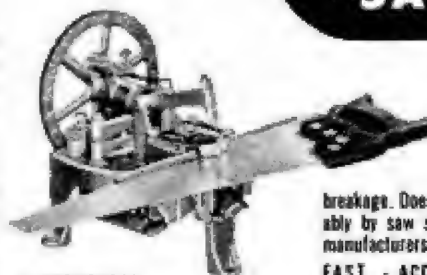
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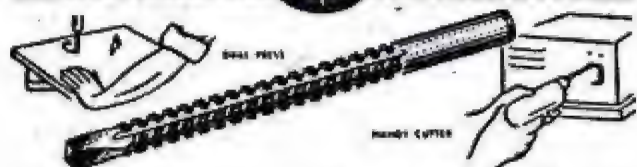
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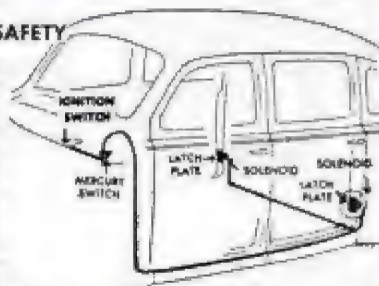
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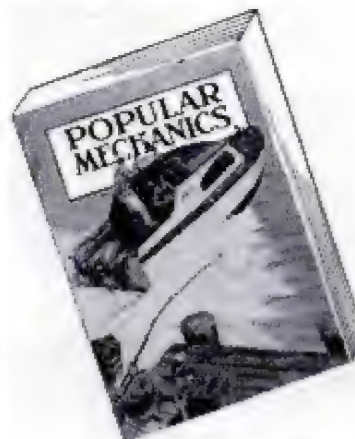
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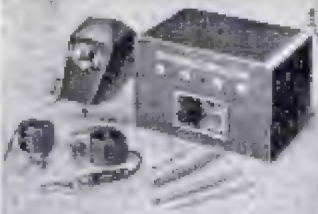
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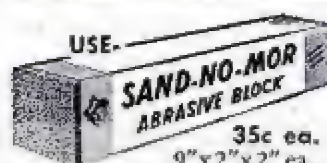
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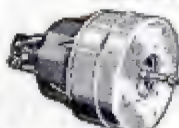
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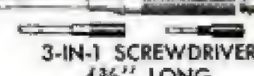
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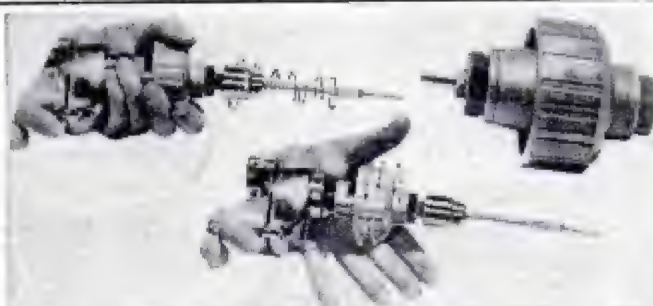
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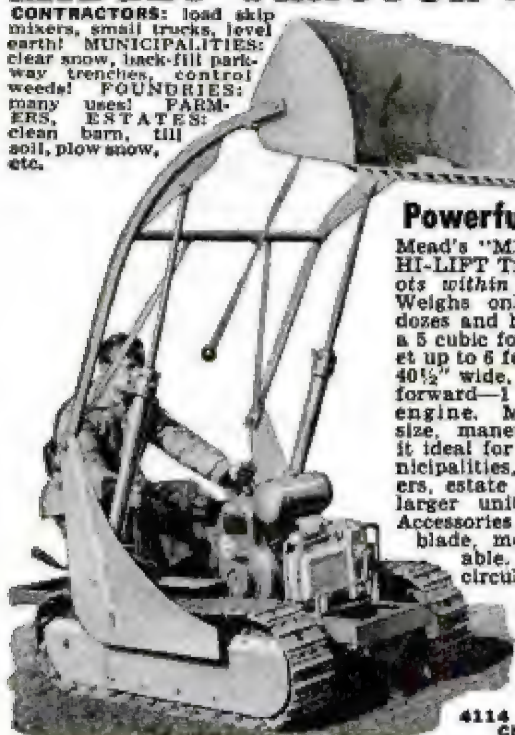
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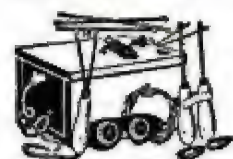
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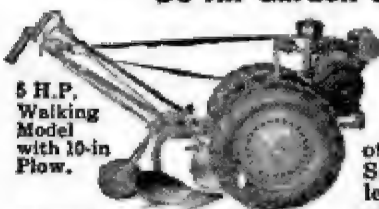
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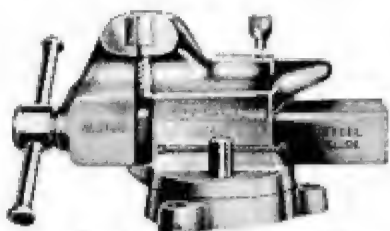
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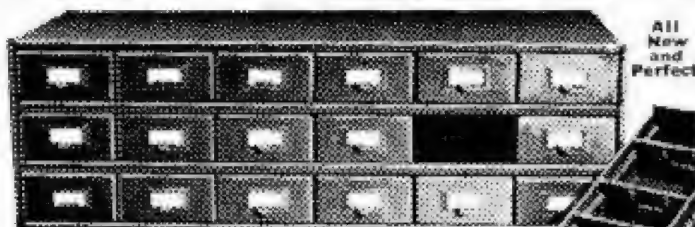
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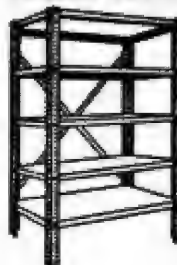
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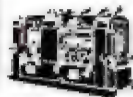
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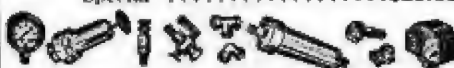
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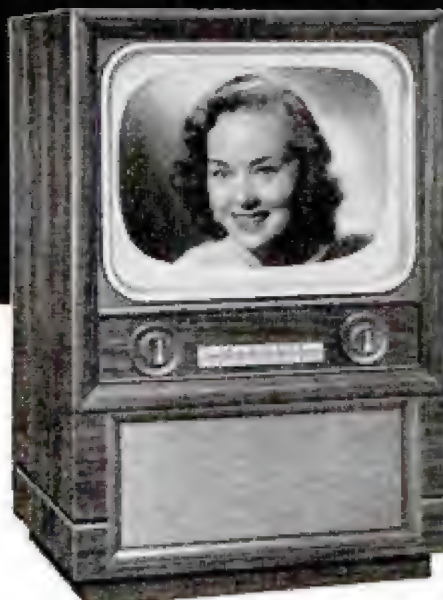
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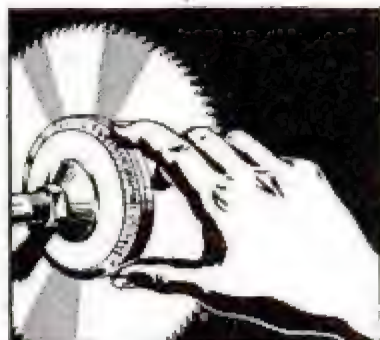
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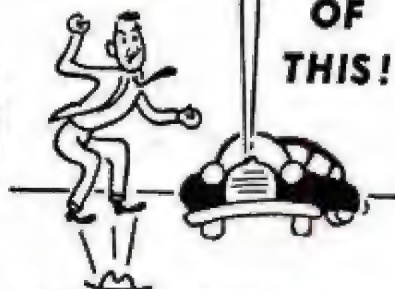
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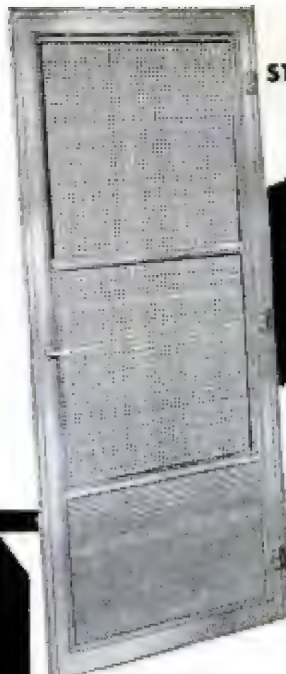
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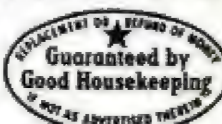
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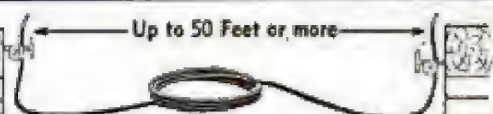
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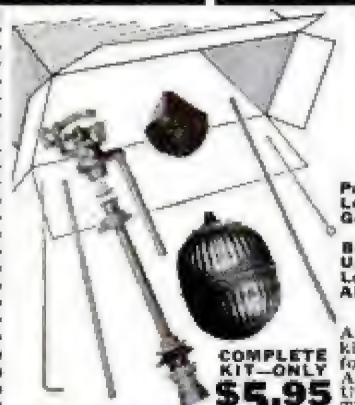
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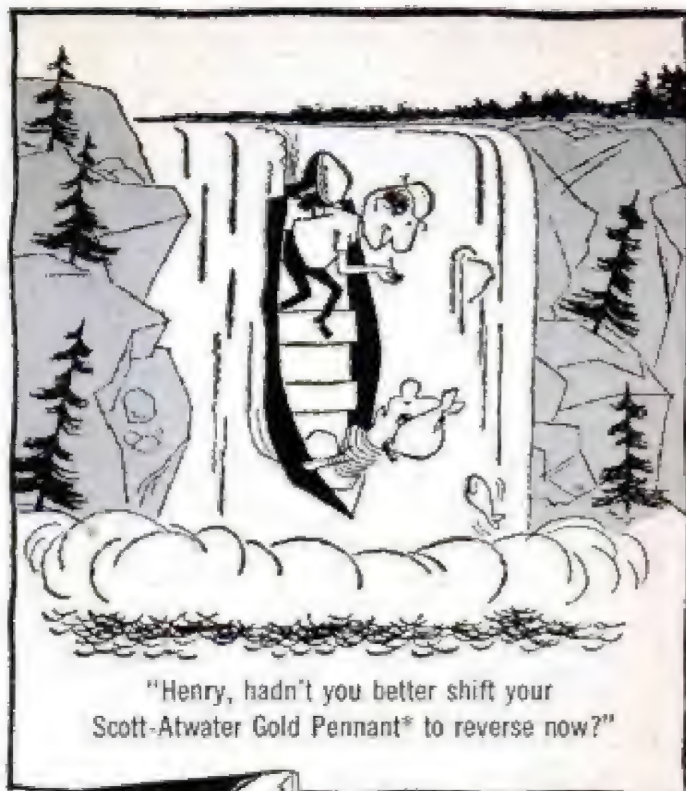
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Made for U. S. Ordnance Dept. to rigid specification. Portable steel hand-carrying unit is a self-contained trouble shooting device for making a complete and rapid check of the generator battery circuit, incl. any circuit & voltage regulators. Battery voltage, regulators, cut-out settings & generator performance easily determined. It's great for garages, mechanics, truck fleet owners, boat and marine mechanics. Can be used on any 6 or 12 volt system. Approx. Govt. cost \$175. NEW. Complete with instruction book, only \$32.50. Shpg. Wt. 20 lbs.

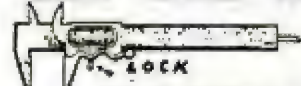


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Chrome plated, precision engineered, carefully tooled to give long life. All new 0-1" capacity—\$2.25 ea., 1-2" capacity—\$3.50.



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Finest aircraft quality... heavy duty... grease-sealed ball bearings. Terrific for truck and marine use, for welders, plating, D. C. Appliances, lights, etc. IFEM No. 90—Type P-1. Mfd. by Ford, General Electric Westinghouse and Delco-Remy. Rated 200 Amps, 28 Volts, 2500 RPM., can be "reved" up to 300 Amps. Shpg. Wt. 53 lbs. Approx. Govt. cost \$350... New to you... \$21.50.

MAKE YOUR OWN ARC WELDER Complete make-up package consisting of one New P1 Generator 200 Amps, one reverse current relay, one voltage regulator and a wiring diagram chart showing conversion of Aircraft Generator to Arc Welder. Nothing else to buy. Special—WHILE THEY LAST—\$32.50.

MAGNETIC BASE INDICATOR HOLDER

For all types of dial indicators with guaranteed ALNICO magnets. V-slotted base has a 45 to 50 lb. pull, permits immediate application without clamps or special attachments and mountings can be made on cylindrical surfaces. For machinists, tool-makers and inspectors. Base 3¼" long by 1½" wide. NEW... \$3.50 ea.



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Gane re-places the
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Did you know that your engine actually uses a richer gasoline mixture when you take your foot off the gas pedal than when you step on it? When your engine slows down or idles, higher manifold vacuum sucks a far richer mixture through the carburetor than needed even for fast driving. At last, engineers designed the Gane Air-Flow needle to bleed air during high manifold vacuum periods and thus try to increase gas mileage. Does it work? Of the more than ½ million users, some report up to 25% more mileage, faster pickup, smoother idling. But some swear at them, say: "no improvement" and fire the "little stinkers" back to us—proving Ganes sometimes fail. That's why we invite you to TRY BEFORE YOU BUY.

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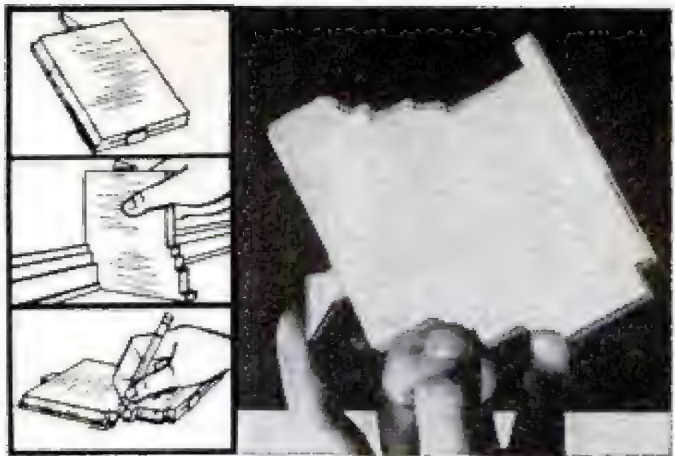
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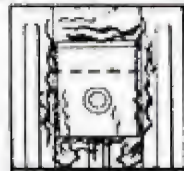
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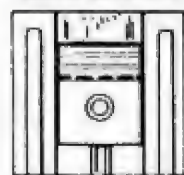
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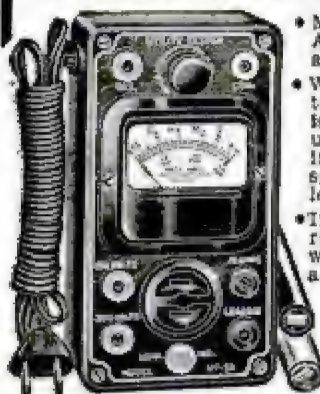
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Handsome round cornered molded bakelite case $3\frac{1}{4}'' \times 5\frac{1}{4}'' \times 2\frac{1}{4}''$. Complete with all test leads and instructions.

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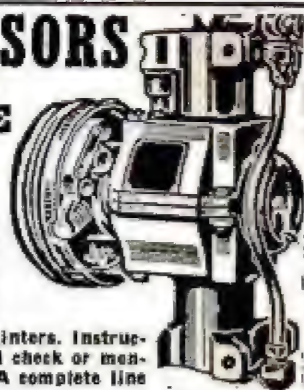


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Model T-1 Complete

Brand new surplus special at an amazing low price. Westinghouse double-piston type 6.54 CFM volume, 2" bore, $1\frac{1}{2}''$ stroke. Runs off power take-off or $\frac{1}{2}$ -hp motor equipped with the V-type direct-drive pulley and belt. For farm, home, industry, painters. Instructions and parts manual included. Send check or money order (parcel post weight 23 lbs.). A complete line of genuine Westinghouse spare parts.

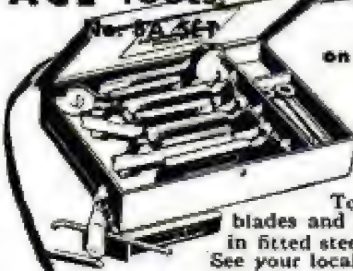


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Lathes—fits shank size
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- 2600 Ohm—1 Watt Wirewound
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- 150 K-Ohm—1/2 Watt
- 1 Megohm—1/2 Watt Carbon
- 47 K-Ohm—1/2 Watt Carbon
- 2 Megohm—1/2 Watt Carbon
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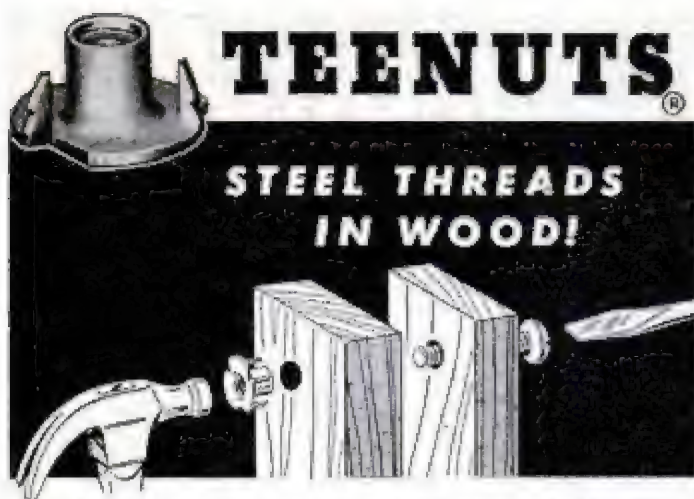
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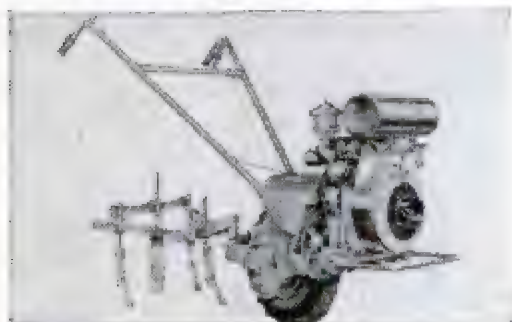
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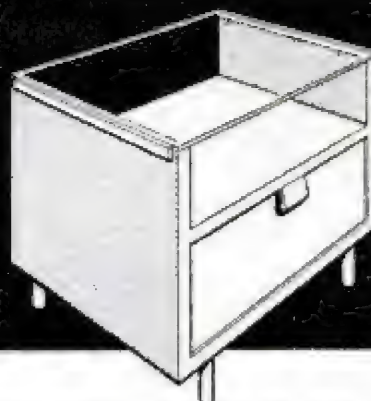
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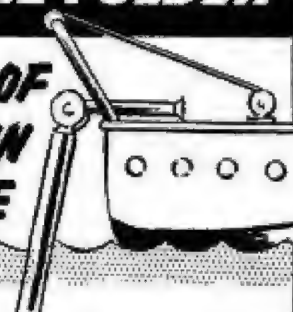
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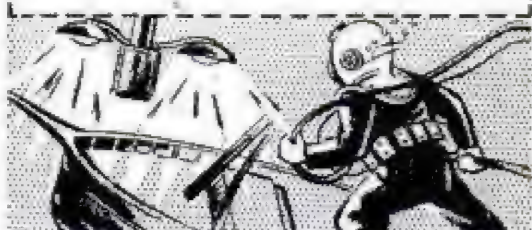
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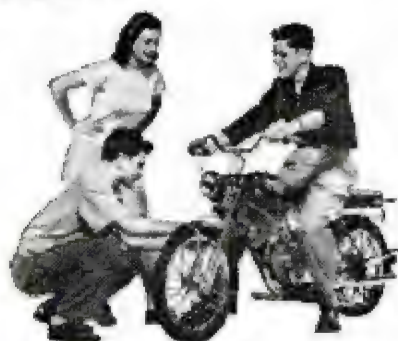
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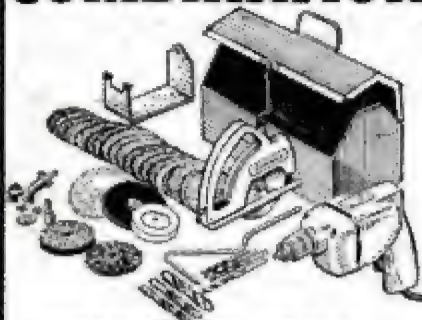
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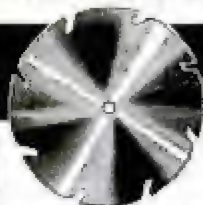
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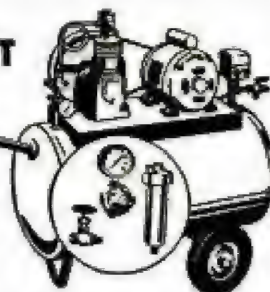
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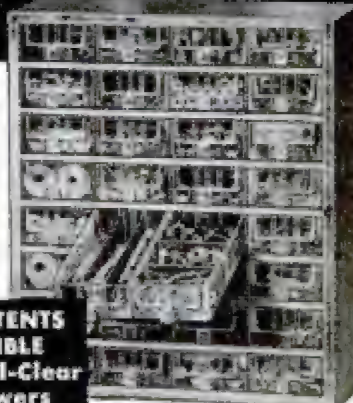
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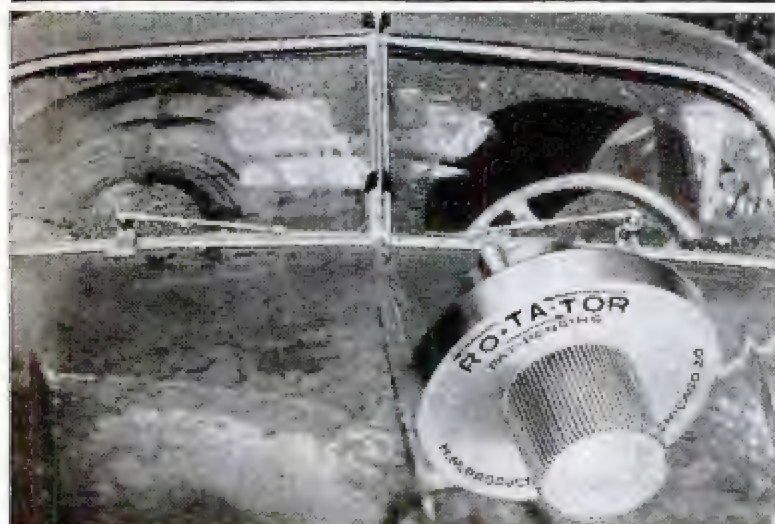
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112 PIECE ASSORTMENT \$3.95
FOR ELECTRIC GRINDER
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18 ROTARY CUTTERS \$5.85
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Assorted discs either on 1/2" or 3/32" shafts. Will fit all hand grinders. Ideal for cutting wood, metal, or plastic. Brand new.



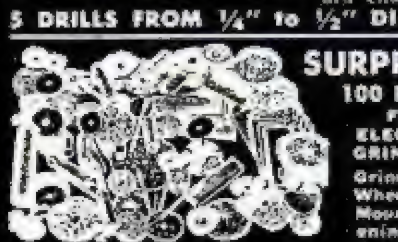
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15 DRILLS FOR ONLY \$2.00! Order Today!

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5 DRILLS FROM 1/4" TO 1/2" DIAMETER—\$1.95

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Grinding Wheels, Cut-off Wheels, Sanding Discs, Mounted Stones, Sharpening and Honing Stones, Rotary Cutting Burs, Abrasive Cartridges, Mandrels, and many other items.

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Sensational Value at \$2.00 p.p.
4 drills, from 5/16" to 1/2" with 1/4" shanks. Brand new, popular sizes.



1953 Illustrated Catalog 10c

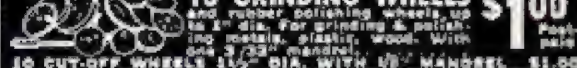
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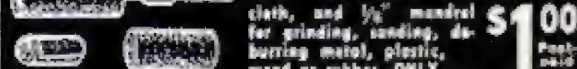
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For grinding on plastic, wood and hard metals. Regular \$2.40. List \$2.95.



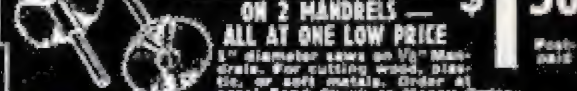
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20 ABRASIVE ROLLS, \$1.00
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With 3 interchangeable collets, opening from 3/32" to 1/2". 1/2" mandrel. Price each only.



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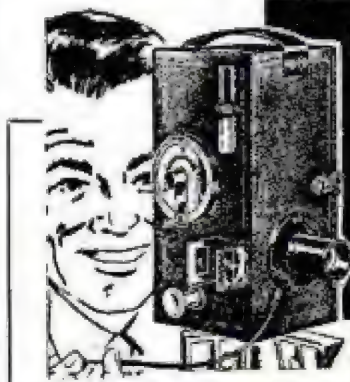
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Rust resistant, alloyed steel. Extra flexible. Pre-formed, 7 x 19 strand. On reels

1/16" - 4 1/2 ft. (7x7)	7/32" - 11 1/2 ft.
5/64" - 5 ft. (6x7)	1/4" - 12 1/2 ft.
3/32" - 5 1/2 ft. (7x7)	5/16" - 15 ft.
1/8" - 7 1/2 ft. (7x19)	5/16" - 16 1/2 ft.
3/32" - 8 1/2 ft.	3/8" - 18 ft.
3/16" - 10 1/2 ft.	1/2" - 20 ft.

Stainless Steel Cable

1/16" - 7 1/2 ft. (7x7)	5/32" - 20 ft.
1/8" - 18 ft. (7x19)	3/16" - 23 ft.

Bronze Cable - Not Pre-Formed

1/16" - 5 ft.	5/16" - 23 ft.
1/4" - 17 ft.	1/2" - 38 ft.

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Originally made for aircraft controls. Equipped with integral fittings at both ends. Rust-proof, 7 x 19 strand.

1/16" x 20 ft. with turnbuckle ends. Two lengths for Only **159**

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G-1 - 12 1/2" x 24" ONLY **395**
D-2 Tank - 500 cu. in. cap. **195**
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No. 3 - Double Action Cylinder. Bore is 1", Shaft 1/2". Stroke adjusts from 2-1/2" to 4" with internal sleeve stops. Length overall 8-1/2". Will take 1500 lbs. continuous - 3000 lbs. intermittent. Will lift or push 1100 lbs. **575**

No. 42 - Double Action Cylinder. Bore is 3-1/4", Shaft 1-1/8". Stroke 9-1/8". Length 17-1/2". Lift capacity with 1500 PSI line pressure approx. 12,441 lbs. **1875**

No. 4 - Double Action Cylinder. Bore 3", Shaft 1-1/8", Stroke 3-1/2", Length 8 1/2". Lift capacity with 1500 PSI line pressure 10,500 lbs. **1875**

No. 53 - Double Action Cylinder. Bore is 2-3/8", shaft 1 1/2", stroke 1 1/2", length 26". Gives 6645 lbs. lift with 1500 lbs. line pressure. **2050**

No. 29 - Double Action Cylinder Special. Gives 20,000 lbs. lift with 1500 PSI line pressure, or will give 40,000 lbs. thrust on intermittent 3000 lb. line pressure. Has 4" bore, 1-1/2" dia. piston shaft, 18" stroke, 30-1/2" length. Ideal for presses, road, farm and shop equipment. Cost Gov't \$390. **2995**

BENDIX HYDRAULIC PUMP AND MOTOR

Has 3 1/2 GPM capacity at 600 PSI. Motor is 1 1/2 HP, 24V, DC. Operates on either 12 or 32V, DC current. Has built-in relief valve adjustable to 1500 PSI. This unit ideal for bail tanks, hyd. lifts, portable loaders, etc. Cost Gov't approximately \$350.00. **1395**

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Self contained, 2 H.P., constant torque at all speeds with variable volume reversible, piston pump (controlled by outside lever) supplying piston hydraulic motor. Automatic pressure, dash pot for smooth control. Power output RPM - 0 to 1/3 input RPM in both directions. Input RPM 1800 continuous. 4000 intermittent. Dash pot can be removed for greater RPM. Ideal for lathes, duplicator set-up of mills, conveyors, small cars, drives, gearings, etc. **4000**

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Capacity, 1 1/2 GPM at 1500 RPM at 1500 PSI. Pressure limit is 1500 PSI continuous, with intermittent maximum of 1875 PSI for 15 seconds. Normal operating speed is 3750 RPM with an intermittent maximum speed of 4500 RPM. Rotates right-hand only. **Now 895**

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Poppet type. Off at neutral. Has pressure inlet, and return & 2 pressure outlets for operating two cylinders independently. Position of handle selects either cylinder. Can also be used with hydraulic motors. Has 1/4" internal ports with 7/16-20 thread. Overall size is 3" in diameter & 1" thickness. **675**

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Cam Piston type. Permits free flow in one direction while checking any 'back flow' until control handle has been positioned to allow free flow in both directions. Has 1/2" tube size ports (3/4"-16 thread) **225**

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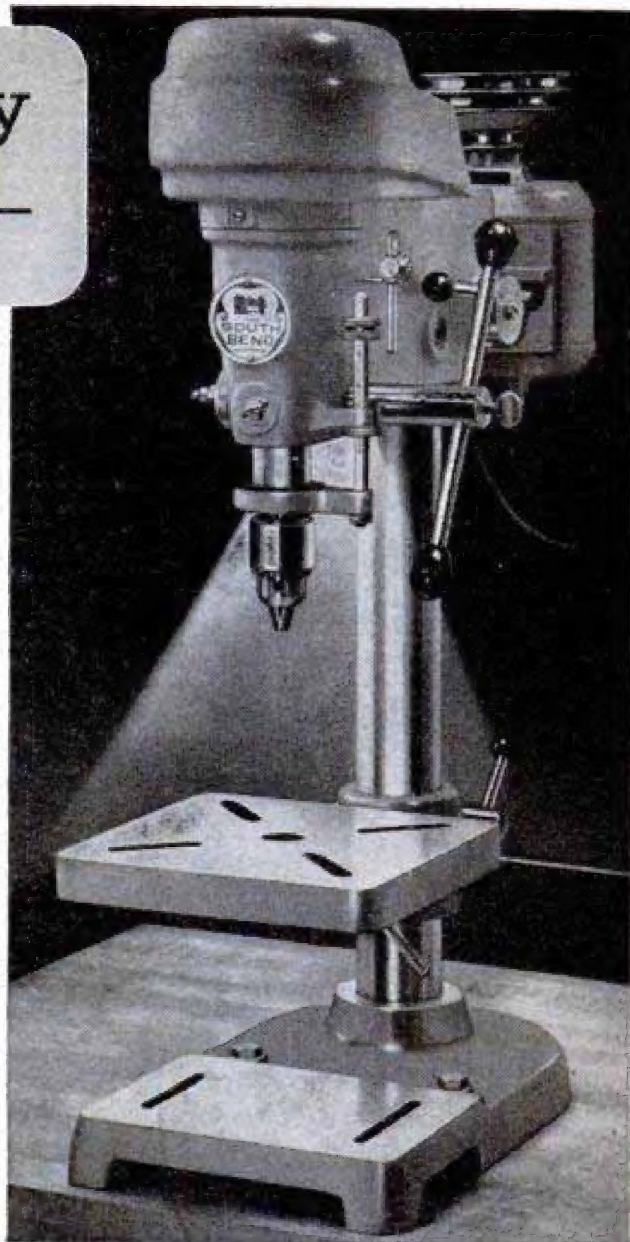
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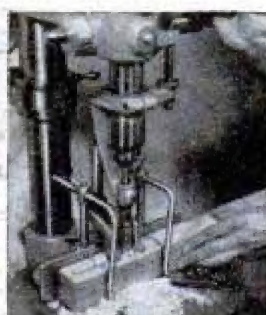


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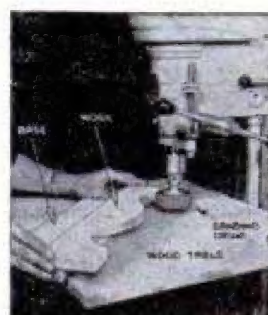
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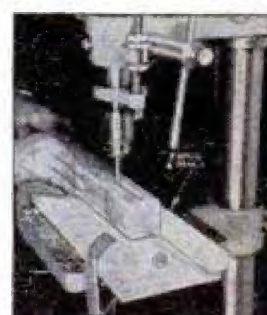
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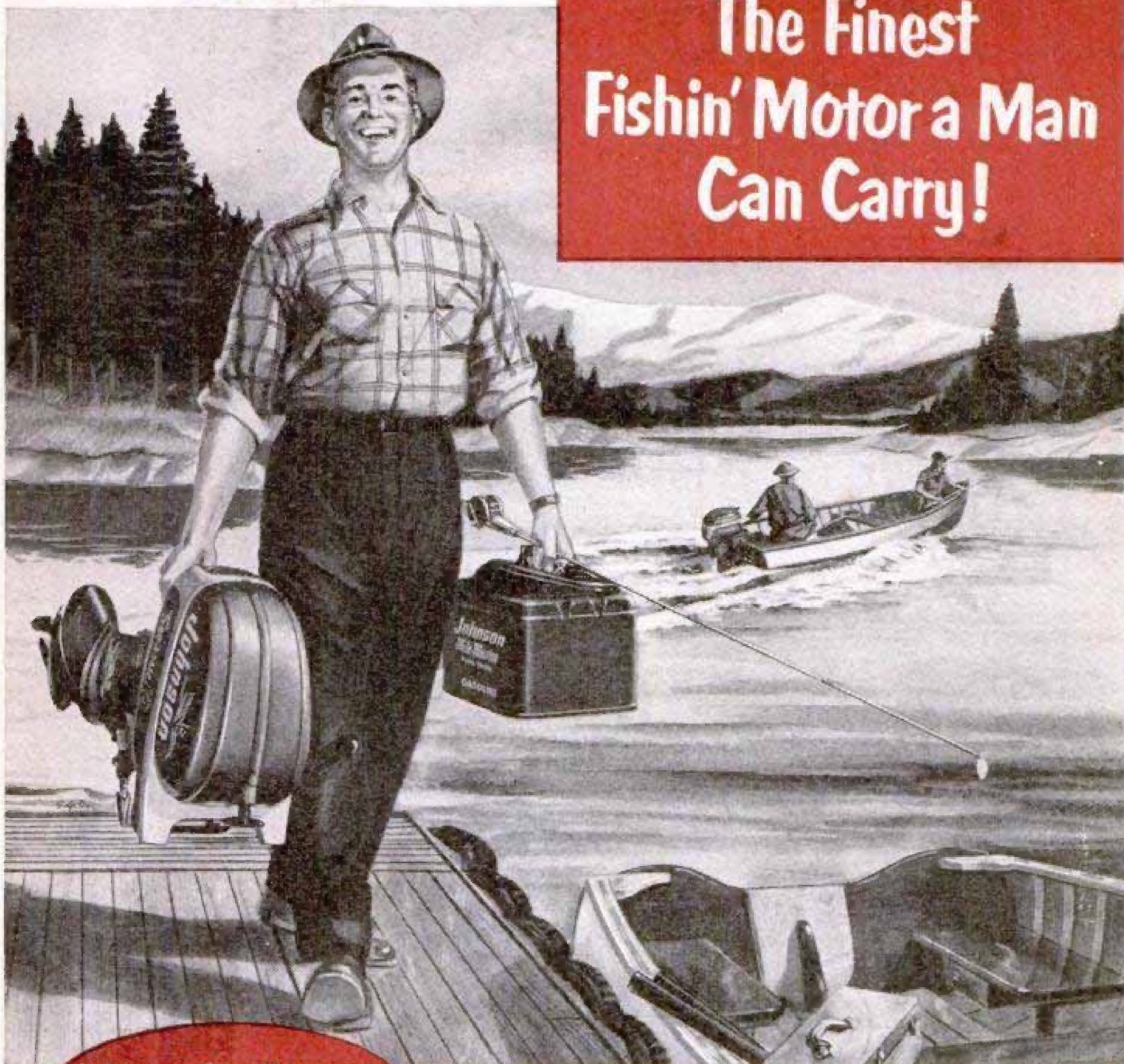
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